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ISO/TC 183/WG 5A DETERMINATION OF LEAD IN LEAD CONCENTRATES STATISTICAL EVALUATION OF INTERNATIONAL TEST DATA 1984-1986

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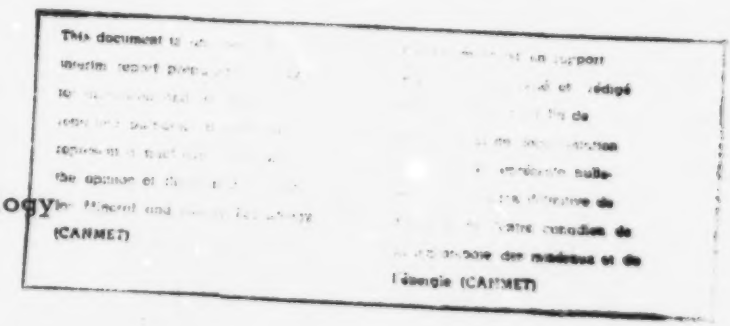
(For submission to the Convener of ISO/TC 183/WG 5A and to the Secretariat of ISO/TC 183)



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Analytical Methodology

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by

R. Sutarno and W.S. Bowman

SUMMARY

The analytical data resulting from the international test on the determination of lead in lead concentrates by four titrimetric methods conducted by ISO/TC 183/WG 5A during the period of 1984-1986 have been statistically evaluated. Based on these analytical results, the preliminary estimates of the precision of the analytical method can be expressed in terms of the Pb concentration level by the following equations:

WG5A-1

$r = 0.004x + 0.257$
$P = 0.004x + 0.748$
$s_r = 0.001x + 0.091$
$s_L = 0.001x + 0.257$

WG5A-2

$r = 0.002x + 0.153$
$P = -0.002x + 0.541$
$s_r = 0.001x + 0.054$
$s_L = -0.001x + 0.190$

WG5A-3

$r = 0.003x + 0.210$
$P = -0.008x + 0.908$
$s_r = 0.001x + 0.074$
$s_L = -0.004x + 0.333$

WG5A-4

$r = 0.005x + 0.327$
$P = -0.002x + 0.852$
$s_r = 0.002x + 0.115$
$s_L = -0.002x + 0.307$

where x is the Pb concentration in the sample, r is the repeatability, P is the permissible tolerance, s_r is the within-laboratory standard deviation and s_L is the between-laboratories standard deviation; all are expressed in percent. Four samples with lead content ranging from 10 to 70 per cent were used in this international test.

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ISO/TC 183/WG 5A - DOSAGE DU PLOMB DANS LES CONCENTRÉS DE PLOMB, ÉVALUATION STATISTIQUE DES DONNÉES DE L'ESSAI INTERNATIONAL 1984-1986

par

R. Sutarno et W.S. Bowman

RÉSUMÉ

Une évaluation statistique a été faite des données analytiques tirées de l'essai international sur le dosage du plomb dans les concentrés de plomb, entrepris selon quatre méthodes de titrimétrie par le groupe d'étude ISO/TC 183/WG 5A au cours de 1984-1986. Ces résultats analytiques révèlent qu'il est possible d'exprimer la précision de la méthode analytique en fonction de la concentration de plomb à l'aide des équations suivantes :

WG5A-1

$r = 0,004x + 0,257$
$P = 0,004x + 0,748$
$s_r = 0,001x + 0,091$
$s_L = 0,001x + 0,257$

WG5A-2

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$s_r = 0,001x + 0,054$
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WG5A-4

$r = 0,005x + 0,327$
$P = -0,002x + 0,852$
$s_r = 0,002x + 0,115$
$s_L = -0,002x + 0,307$

où x représente la concentration de plomb dans l'échantillon; r, la répétabilité; P, la tolérance permise; s_r, l'écart-type dans un laboratoire; et s_L, l'écart-type d'un laboratoire à l'autre. Toutes ces données sont exprimées en pourcentage. Quatre échantillons ayant une teneur en plomb variant de 10 % à 70 % ont été utilisés dans cet essai international.

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INTRODUCTION

The analytical data were collected by the convener of ISO/TC 183/WG 5A (ISO Technical Committee 183 - Copper, Lead and Zinc Ores and Concentrates, Working Group 5A - Lead in Lead Concentrates) from an international test conducted during the period of 1984-1986. Three samples of concentrates with lead contents ranging from 10 to 70 per cent were used. Four methods were tested.

Fourteen laboratories provided analytical data for methods 1 and 3, eleven for method 2 and six laboratories for method 4; each analysed the samples in triplicate.

The purpose of this statistical evaluation is to provide the working group with the preliminary estimates of the precision in the form of repeatability(r), permissible tolerance(P), and within-laboratory(s_r) and between-laboratories(s_L) standard deviations.

PRINCIPLE OF THE ANALYTICAL METHODS

(1). WG5A-1[1]

Dissolution of the test portion in a mixture of hydrochloric acid, hydrofluoric acid and perchloric acid and evaporation to fumes of perchloric acid.

Addition of tartaric acid solution, sodium hydroxide

solution and sodium cyanide solution. Extraction of the lead with sodium diethylthiocarbamate in chloroform.

Addition of nitric acid and perchloric acid to the chloroform solution. Evaporation of the chloroform followed by oxidation of residual organic matter.

Addition of tartaric acid, ammonium chloride/ammonium hydroxide buffer solution, sodium cyanide solution, triethanolamine and ascorbic acid. Titration with ethylene diamine tetraacetic acid (EDTA) using methyl thymol blue indicator.

(2). WG5A-2[2]

Dissolution of test portion by fusion with sodium peroxide or by acid attack in the case where the sample contains totally acid-soluble lead.

Double precipitation of lead as a sulfate, with removal of bismuth if applicable.

Dissolution of lead sulfate in a known volume of an alkaline EDTA solution.

Titration of EDTA in excess by a standard zinc solution with visual, potentiometric or voltametric detection of end point.

(3). WG5A-3[3]

Decomposition of the test portion with nitric acid. Addition of sulfuric acid to the decomposition product, and heat to let it evolve white fumes of sulfuric acid. After dissolving the soluble salts with water, ethyl alcohol is added to the mixture, and the resulting mixture is fitered to separate lead sulfate precipitate.

Dissolve the precipitate in a mixed solution of ammonium acetate and acetic acid, filter the mixture to remove the insoluble residue, and adjust the pH of the filtrate to 5.5 to 5.7. Titrate the pH adjusted filtrate with a standard EDTA solution using xylenol orange as an indicator.

(4). WG5A-4[4]

Dissolution in a mixture of nitric acid and sulfuric acids and elimination of volatile chlorobromides.

Redissolution in hydrobromic solution and cementation by copper powder to remove silver and bismuth.

Taking of an aliquot part and cementation of the lead by cadmium powder.

Separation of the cement, redissolution and precipitation of the lead sulfate.

Filtration, redissolution by acetate and reprecipitation of the lead sulfate.

Filtration on tared porous crucible, calcination and weighing. At this stage, it is possible to replace the gravimetry by complexometric titration.

STATISTICAL EVALUATION

The analytical data collected were statistically evaluated by the procedure described in document ISO/TC 102/TCR 5[5]. Because each participating laboratory analysed only one bottle of each sample, as required by WG Stage A, the two-way analysis of variance (ANOVA) part of the procedure was by-passed. No confir-

mation of sample homogeneity was made; thus the between-laboratories variance may include the between-bottles variation of the sample. This procedure is illustrated schematically in Figure 1.

The raw data and the detailed calculations are presented in Appendix A. They are summarized in Tables 1 and 2. The raw data are also plotted in Figures 2. The boxed points in these figures signify that the data were suspected to be outliers and were excluded from the estimation of the sample means and precisions. The letter C on the boxed points signifies that the data were suspected to be outliers due to poor precision (Cochran's test) and the letter D due to the deviation from the sample means (Dixon's test). All tests for outliers were at 5% levels of significance.

The estimated precisions (s_r, s_L, r and P) are plotted against their corresponding sample means in Figure 3, and the regression equations of these precisions against sample means were computed and presented in Table 1. Table 2 lists the suspected outliers. Table 3 shows the comparison of sample grand means and precisions obtained by the results of the three methods.

OBSERVATIONS

An ideal standard analytical method is an analytical method that can be applied by any qualified analyst with proper equipment and reagents, with equal precision and accuracy. This implies that, the better the method is standardized, the smaller is the s_L/s_r ratio, and the fewer the number of outliers. The magnitude

of the within-laboratory standard deviation itself depends on the state of the art of the method. Experience from another Technical Committee dealing with mineral analyses (iron ores) shows that for a good method, the average s_L/s_r ratio is found to be about 2. This empirical value has also been confirmed by the s_L/s_r ratio values obtained by the results of international tests conducted by other TC 183 working groups (WG 1A, WG 2A, WG 3A and WG 4A).

Table 1 shows that the within laboratory precision is not as good as expected by the convener (based on his preliminary test); as a consequence the s_L/s_r ratios appear to be reasonable. These ratios may not have been as good if the within laboratory precision was as expected. Table 1a shows that although they are preliminary estimates, the regression equations indicate that there is only a small dependency of the precision on the level of Pb concentration, i.e., the slopes of the regression lines are less than 1%. This is generally considered to be a good sign for major elements. Table 3 shows that the grand means obtained by the four methods tested are generally very close. Method WG5A-2 seems to produce the most precise results. On the other hand this method seems to produce relatively high results on one of the samples (85-13); this is probably caused by an anomaly of the sample since another method (WG5A-4) produced relatively low results for this sample. Table 2 shows that the number of outliers is reasonable with the exception of Lab 3 and Lab 8, which seems to have some difficulties.

REFERENCES

1. "Lead concentrate - Determination of lead content by acid dissolution solvent extraction EDTA titration method", First working draft, ISO/TC 183 (WG5A-1) N 126 E, 1986-03-27.

2. "Lead concentrates - Determination of lead content by back titration of EDTA using solution of zinc after lead precipitation of lead sulfate", First working draft, ISO/TC 183 (WG5A-2) N 127 E, 1986-03-27.

3. "Lead concentrates - Determination of lead content by acid dissolution, separation of lead sulfate and titration with EDTA method", First working draft, ISO/TC 183 (WG5A-3) N 128 E, 1986-03-27.

4. "Lead concentrates - Determination of lead content by acid dissolution, separation of lead by cementation and gravimetric determination by weighing lead sulfate", First working draft, ISO.TC 183 (WG5A-4) 129 E, 1986-03-27.

5. "Procedure for statistical evaluation of analytical data resulting from international tests",ISO/TC 102/TCR 5,1985-06-11.

Key words

lead, concentrates, chemical analysis, analytical method, precision, outlier, international test, statistic, ISO, standard.

Abbreviations Used in this Report

s_r = SIGMA-R - within laboratory standard deviation

s_L = SIGMA-L - between laboratories standard deviation

r* = R - repeatability

= $2.83\ s_r$

P** = permissible tolerance

= $2.83\ (s_L^2 + s_r^2/2)^{1/2}$

Ko = total number of participating laboratories

K = number of sets of laboratory results used for analysis of variance (ANOVA)

No = total number of analytical results

N = number of analytical results used for ANOVA

* Repeatability, r, is the value below which the absolute difference between two independent single test (analysis) results produced by a laboratory on identical material, using the same equipment, within a short interval of time, using the standardized method, may be expected to lie within a 95% probability.

** Permissible tolerance between laboratories, P, is the value below which the absolute difference between two means of duplicate test (analysis) results on identical material, obtained by operators of different laboratories using the standardized test method, may be expected to lie within a 95% probability.

Table 1

ISO/TC 183/WG 5A LEAD IN LEAD CONCENTRATES
Summary of Precision

El	Sample	Ko	K	No	N	x	r	P	s_r	s_L	s_L/s_r
						WG5A-1					
Pb	85-12	14	13	42	39	36.954	0.345	0.830	0.122	0.280	2.30
Pb	85-13	14	14	41	41	10.820	0.331	0.906	0.117	0.309	2.65
Pb	85-14	14	12	42	36	50.066	0.419	0.723	0.148	0.233	1.57
Pb	85-15	14	13	42	39	70.621	0.552	1.207	0.195	0.404	2.07
						WG5A-2					
Pb	85-12	11	10	33	30	36.938	0.201	0.349	0.071	0.113	1.58
Pb	85-13	11	10	33	30	11.292	0.186	0.537	0.066	0.184	2.80
Pb	85-14	11	10	33	30	50.224	0.243	0.591	0.086	0.200	2.33
Pb	85-15	11	9	33	27	70.884	0.293	0.362	0.104	0.105	1.01
						WG5A-3					
Pb	85-12	14	11	42	33	36.924	0.158	0.276	0.056	0.089	1.59
Pb	85-13	14	13	42	39	10.788	0.332	0.970	0.117	0.333	2.84
Pb	85-14	14	13	42	39	50.151	0.418	0.661	0.148	0.209	1.42
Pb	85-15	14	12	42	36	70.895	0.498	0.415	0.176	0.077	0.44
						WG5A-4					
Pb	85-12	6	6	18	18	36.666	0.507	1.004	0.179	0.331	1.85
Pb	85-13	6	6	18	18	10.641	0.507	0.822	0.179	0.261	1.46
Pb	85-14	6	5	18	15	50.062	0.182	0.342	0.064	0.112	1.74
Pb	85-15	6	6	18	18	70.624	0.917	0.827	0.324	0.182	0.56

Table 1a

ISO/TC 183/WG 5A Pb in Pb Concentrates
Regression Equations

Equation	Corr. Coeff.	Equation	Corr. Coeff
WG5A-1		WG5A-2	
$r = 0.004x + 0.257$	0.912	$r = 0.002x + 0.153$	0.953
$P = 0.004x + 0.748$	0.482	$P = -0.002x + 0.541$	-0.388
$s_r = 0.001x + 0.091$	0.912	$s_r = 0.001x + 0.054$	0.953
$s_L = 0.001x + 0.257$	0.413	$s_L = -0.001x + 0.190$	-0.481
WG5A-3		WG5A-4	
$r = 0.003x + 0.210$	0.500	$r = 0.005x + 0.327$	0.401
$P = -0.008x + 0.908$	-0.641	$P = -0.002x + 0.852$	-0.218
$s_r = 0.001x + 0.074$	0.581	$s_r = 0.002x + 0.115$	0.401
$s_L = -0.004x + 0.333$	-0.779	$s_L = -0.002x + 0.307$	-0.536

Table 2

ISO/TC 183/WG 5A Pb in Pb Concentrates
List of outliers

El	Meth	Sample	Cochran (Precision)	Dixon (Accuracy)
Pb	WG5A-1	85-12	-	LAB 8
Pb		85-13	-	-
Pb		85-14	LAB 3 LAB 8	LAB 8 -
Pb		85-15	LAB 8	LAB 8
Pb	WG5A-2	85-12	-	LAB15
Pb		85-13	-	LAB14
Pb		85-14	LAB14	-
Pb		85-15	- -	LAB14 LAB15
Pb	WG5A-3	85-12	LAB 3 LAB 6 LAB 7	- - -
Pb		85-13	-	LAB 3
Pb		85-14	LAB 3	-
Pb		85-15	LAB 3 -	LAB 3 LAB 5
Pb	WG5A-4	85-12	-	-
Pb		85-13	-	-
Pb		85-14	LAB11	LAB11
Pb		85-15	-	-

Table 3

ISO/TC 183/WG 5A LEAD IN LEAD CONCENTRATES
Comparison between means (x) and precisions obtained by various methods

Sample	Method				Relative to WG5A-1			
	WG5A-1	WG5A-2	WG5A-3	WG5A-4	WG5A-1	-2	-3	-4
				x (%)				
85-12	36.954	36.938	36.924	36.666	1.00	1.00	1.00	0.99
85-13	10.820	11.292	10.788	10.641	1.00	1.04	1.00	0.98
85-14	50.066	50.224	50.151	50.062	1.00	1.00	1.00	1.00
85-15	70.621	70.884	70.895	70.624	1.00	1.00	1.00	1.00
				s_r (%)				
85-12	0.122	0.071	0.056	0.179	1.00	0.58	0.46	1.47
85-13	0.117	0.066	0.117	0.179	1.00	0.56	1.00	1.53
85-14	0.148	0.086	0.148	0.064	1.00	0.58	1.00	0.43
85-15	0.195	0.104	0.176	0.324	1.00	0.53	0.90	1.66
				s_L (%)				
85-12	0.280	0.113	0.089	0.331	1.00	0.40	0.32	1.18
85-13	0.309	0.184	0.333	0.261	1.00	0.59	1.07	0.84
85-14	0.233	0.200	0.209	0.112	1.00	0.85	0.90	0.48
85-15	0.404	0.105	0.077	0.182	1.00	0.26	0.19	0.45
				s_L/s_r				
85-12	2.30	1.58	1.59	1.85	-	-	-	-
85-13	2.65	2.80	2.84	1.46	-	-	-	-
85-14	1.57	2.33	1.42	1.74	-	-	-	-
85-15	2.07	1.01	0.44	0.56	-	-	-	-

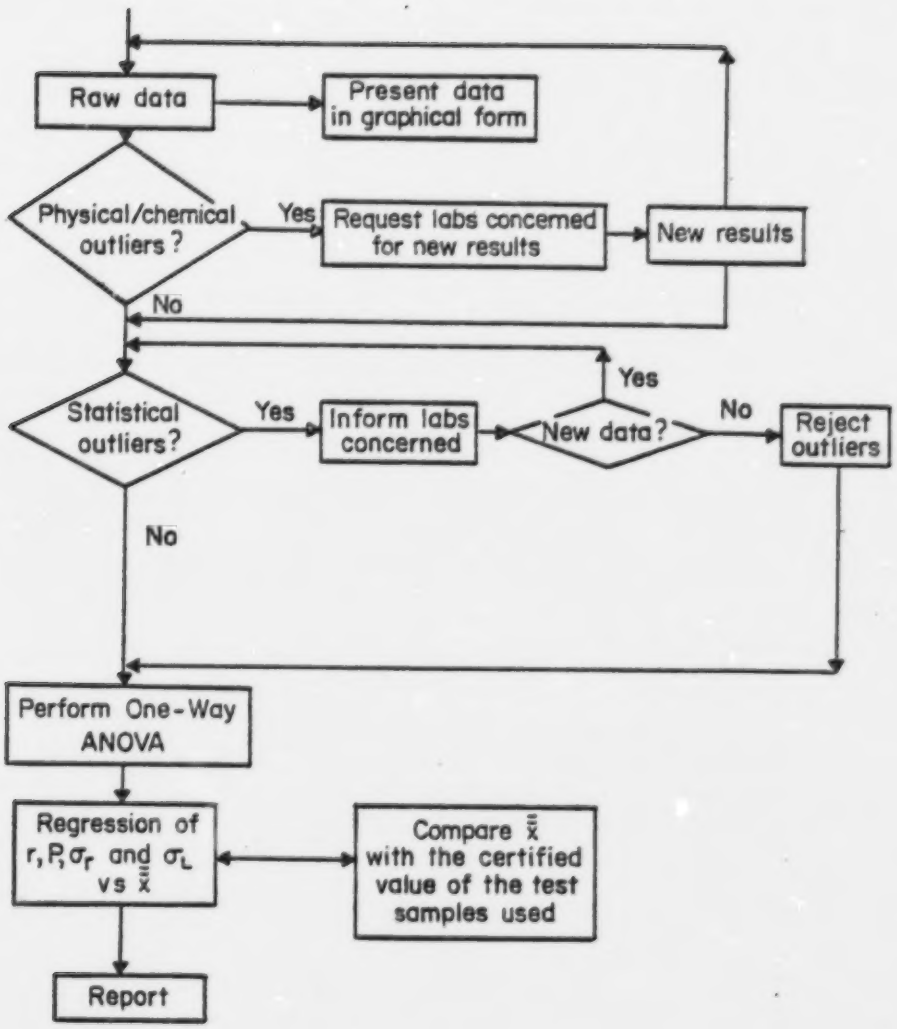

Figure 1. Flow Chart of the Procedure for Statistical Evaluation of Analytical Data Resulting from International Tests If The Test Sample is Known to be Homogeneous.

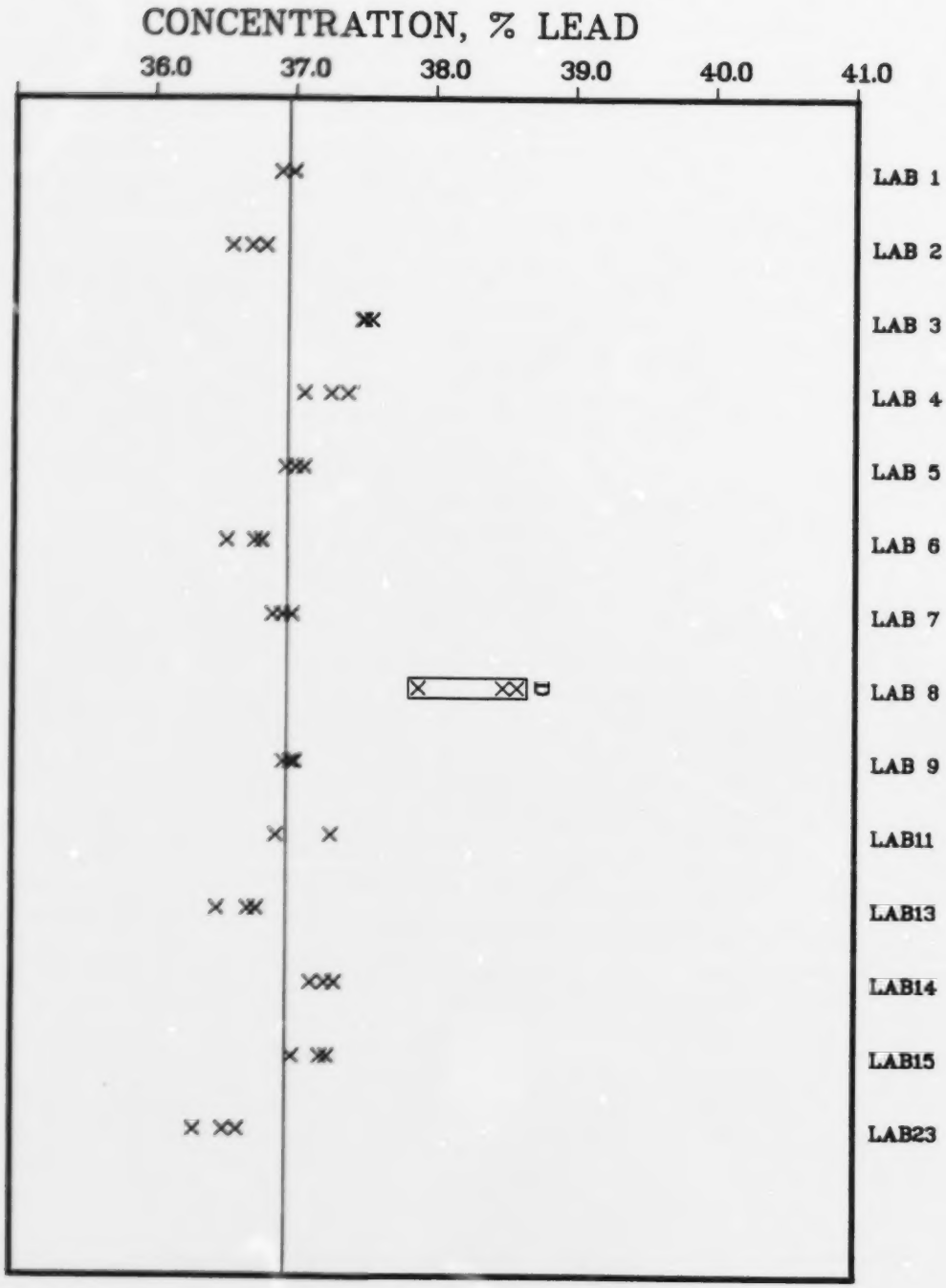

Figure 2.1.1

ISO/TC 183/WG 5A ---- LEAD IN LEAD CONCENTRATES ---- METHOD WG 5A-1

SAMPLE 85-12 MINERALSMIN & MET LEAD WT %

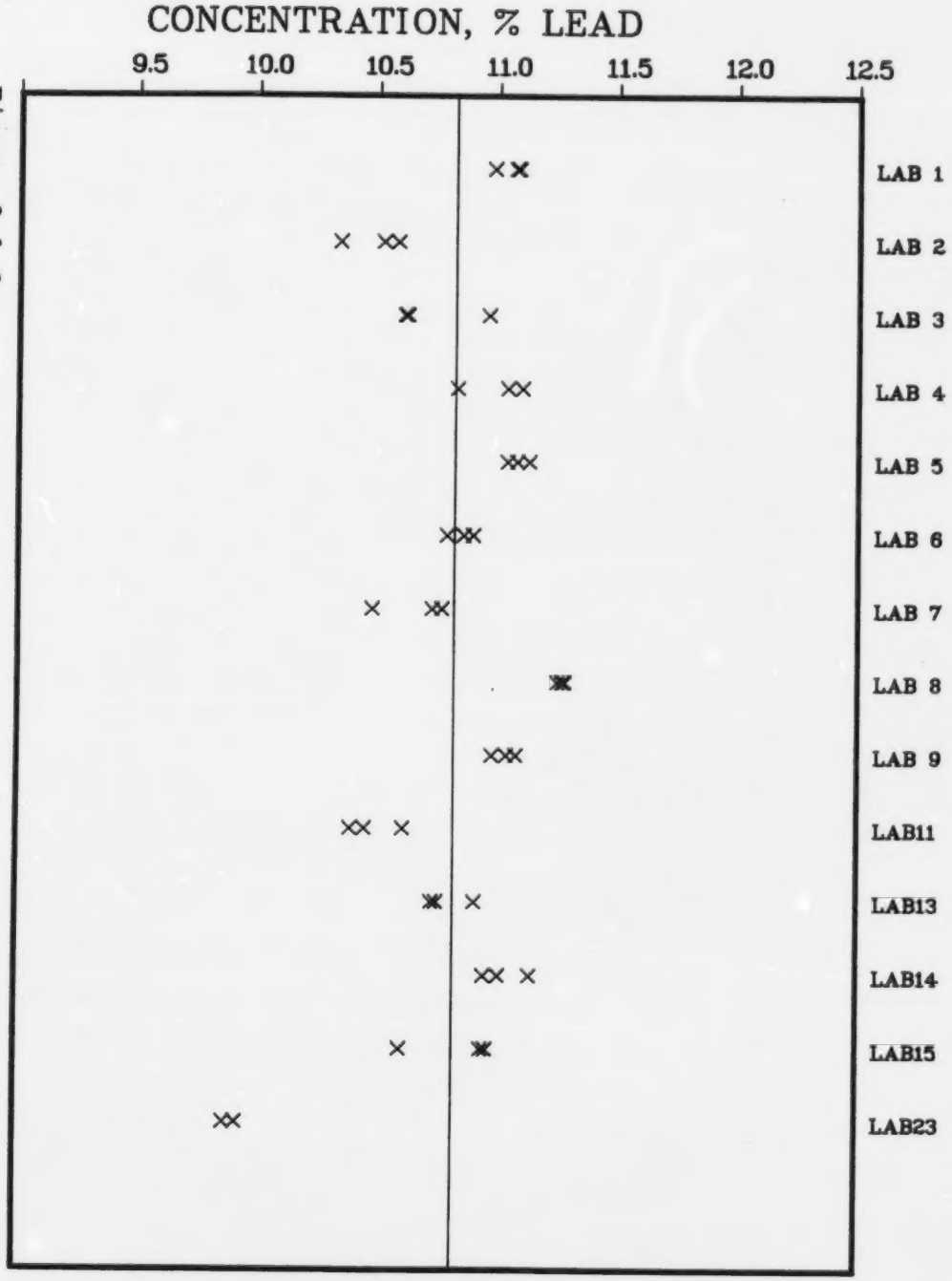

Figure 2.1.2

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-1

SAMPLE: 85-13 CLEVELAND TIN-LEAD LEAD WT %

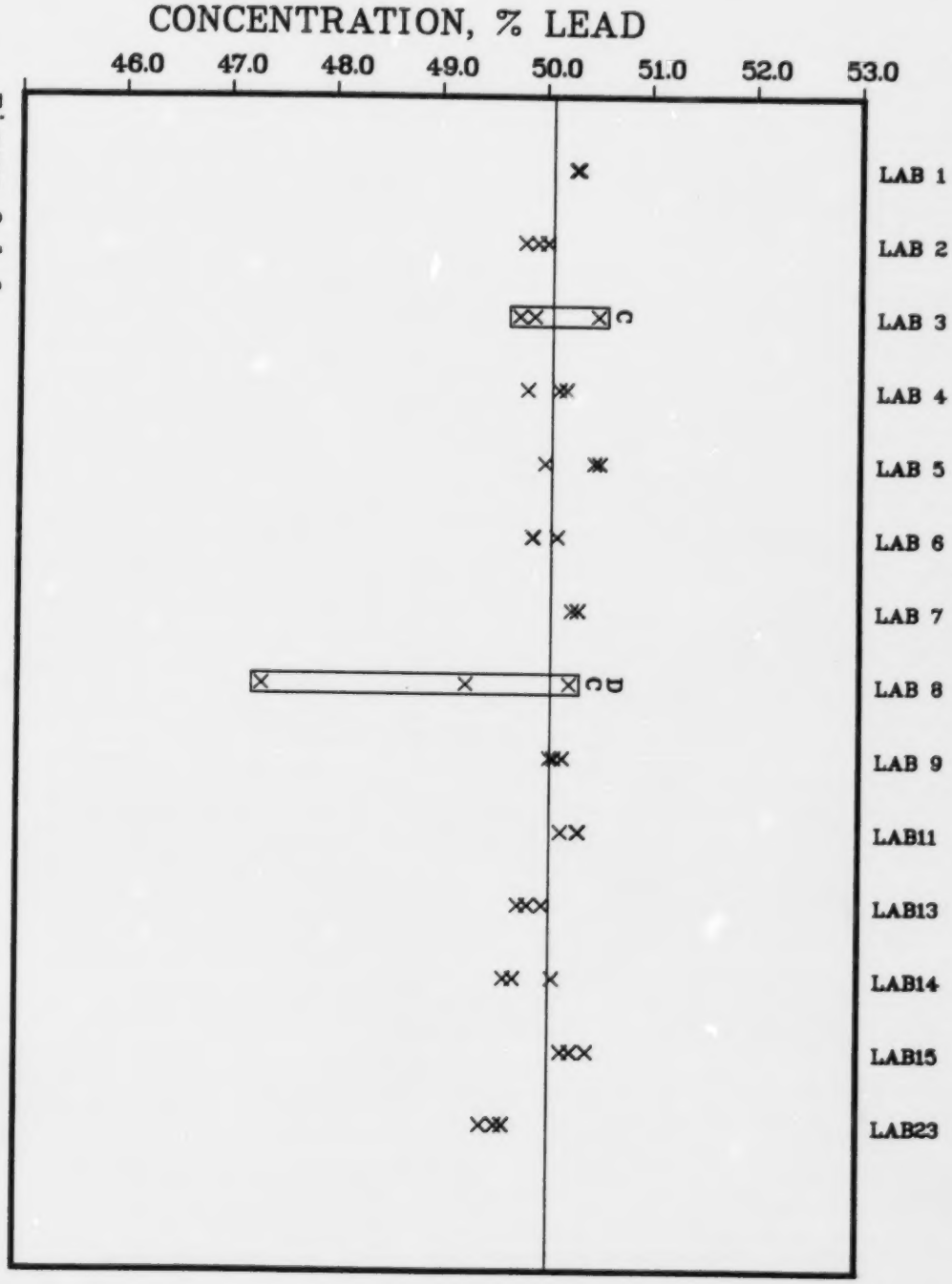

Figure 2.1.3

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-1

SAMPLE: 85-14 ELURA CONC LEAD WT %

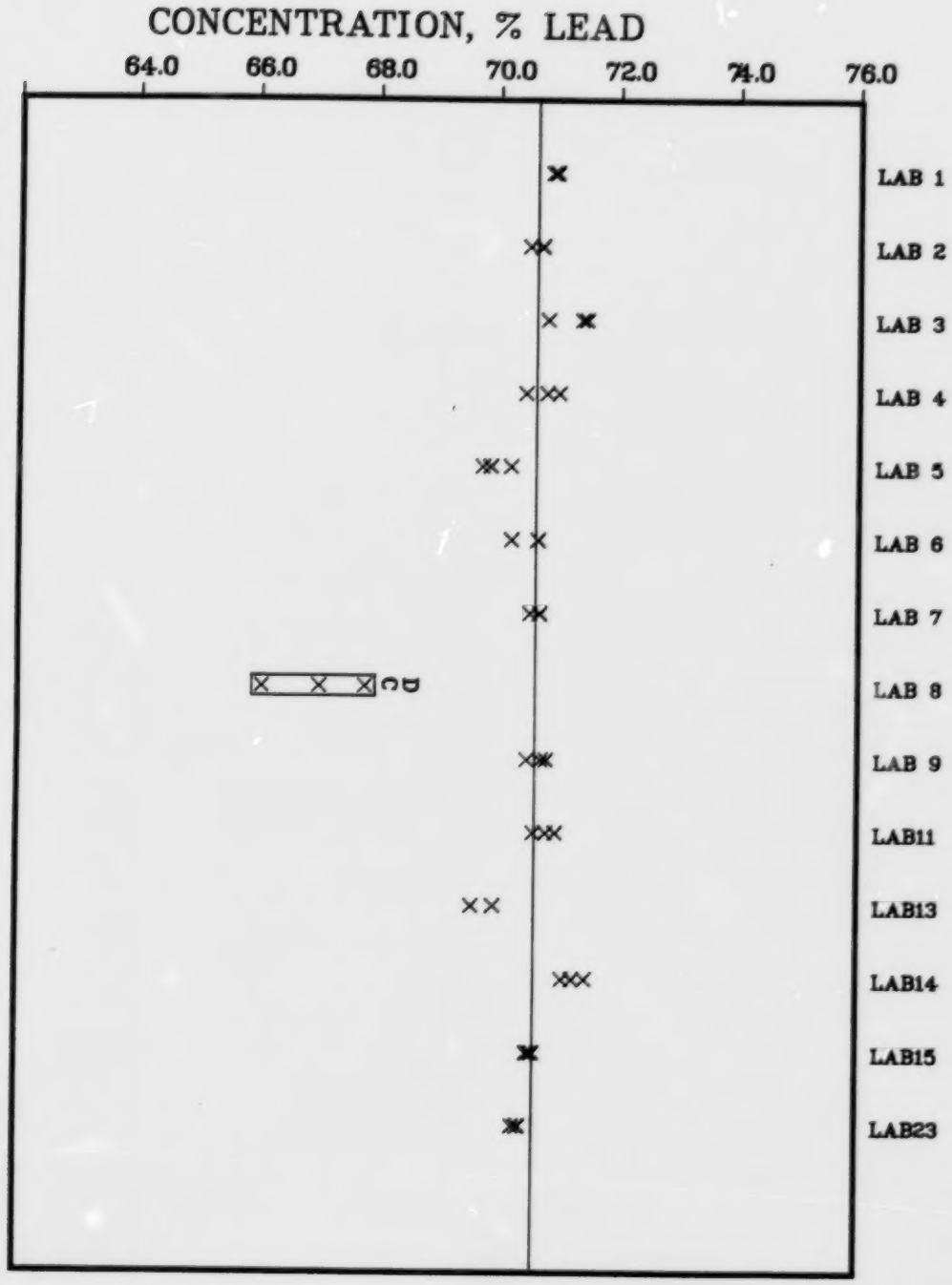

Figure 2.1.4

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-1

SAMPLE 85-15 NORTH BROKEN HILL LEAD WT %

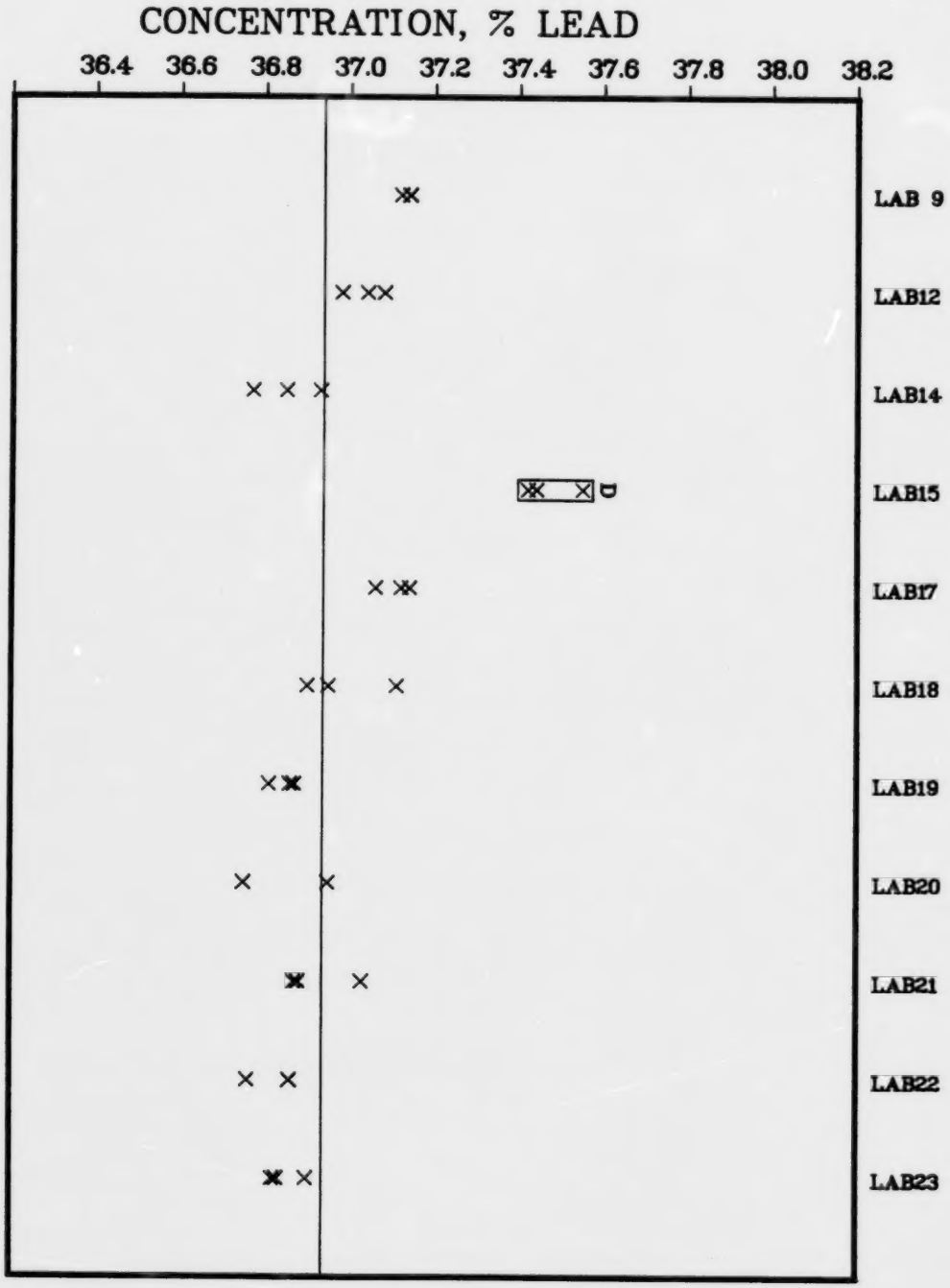

Figure 2.2.1

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-2

SAMPLE: 85-12 MINERALS,MIN & MET LEAD WT %

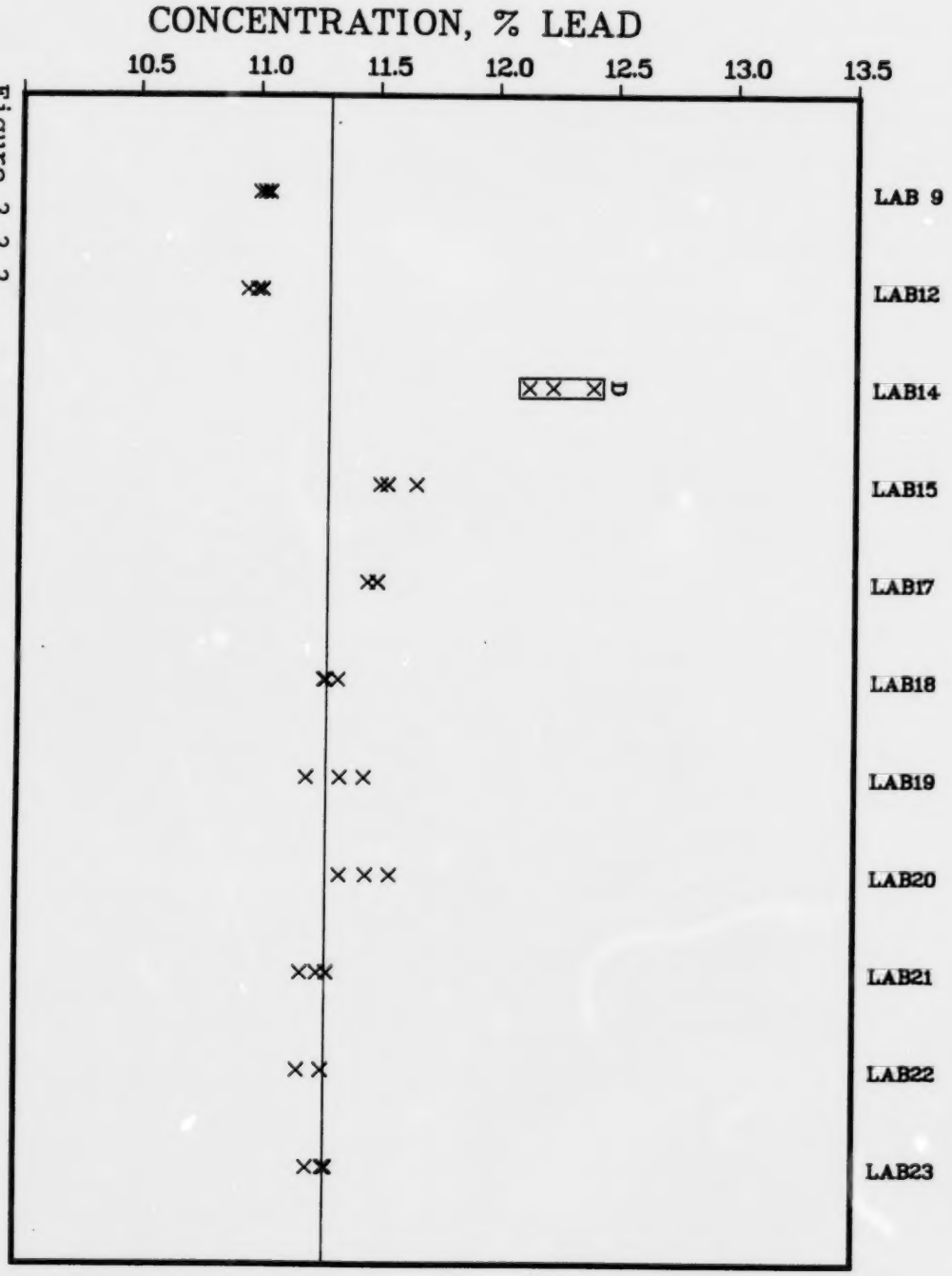

Figure 2.2.2

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-2

SAMPLE: 85-13 CLEVELAND TIN-LEAD LEAD WT %

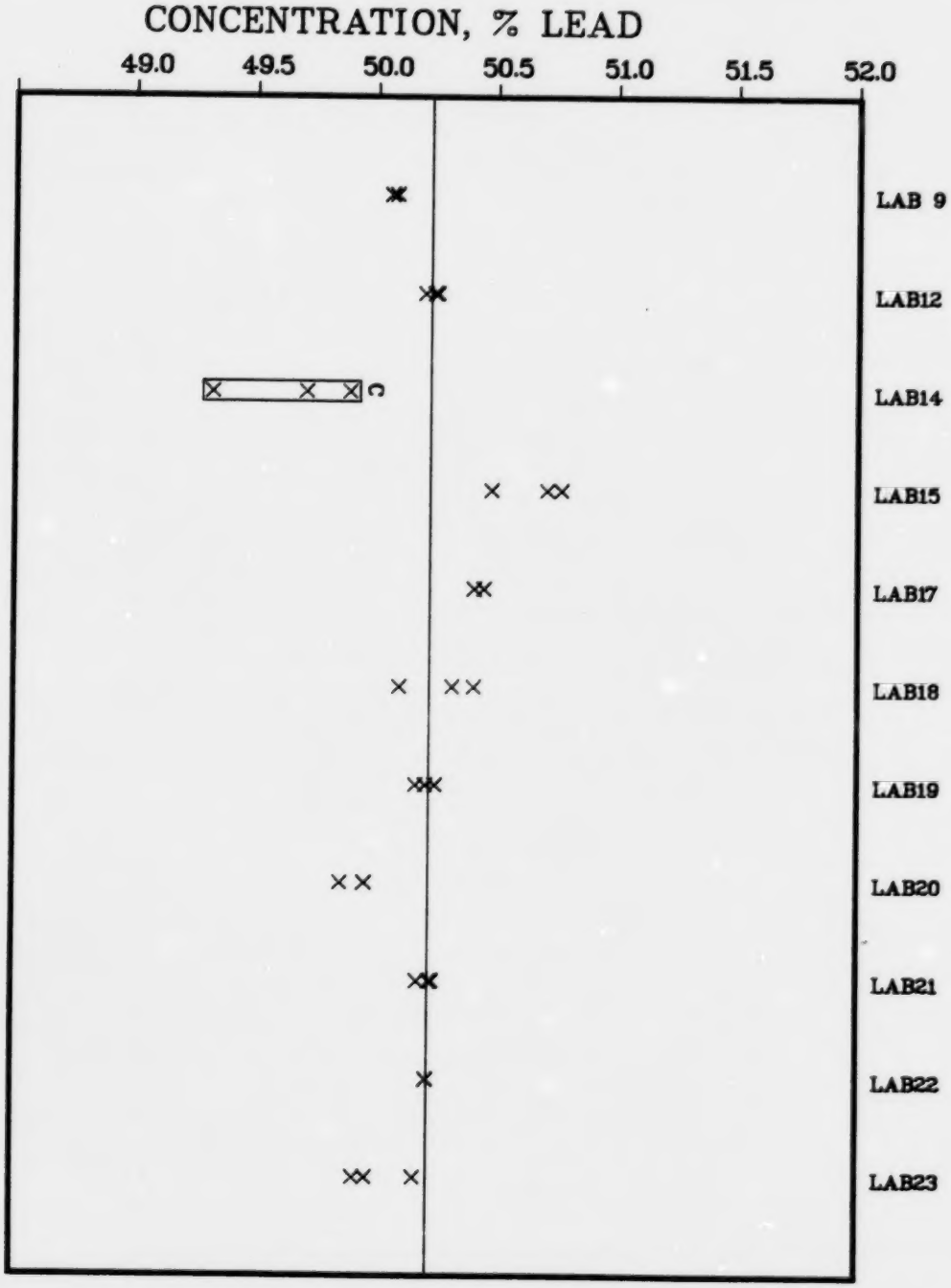

Figure 2.2.3

ISO/TC 183/WG 5A —— LEAD IN LEAD CONCENTRATES —— METHOD WG 5A-2

SAMPLE: 85-14 ELURA CONC LEAD WT %

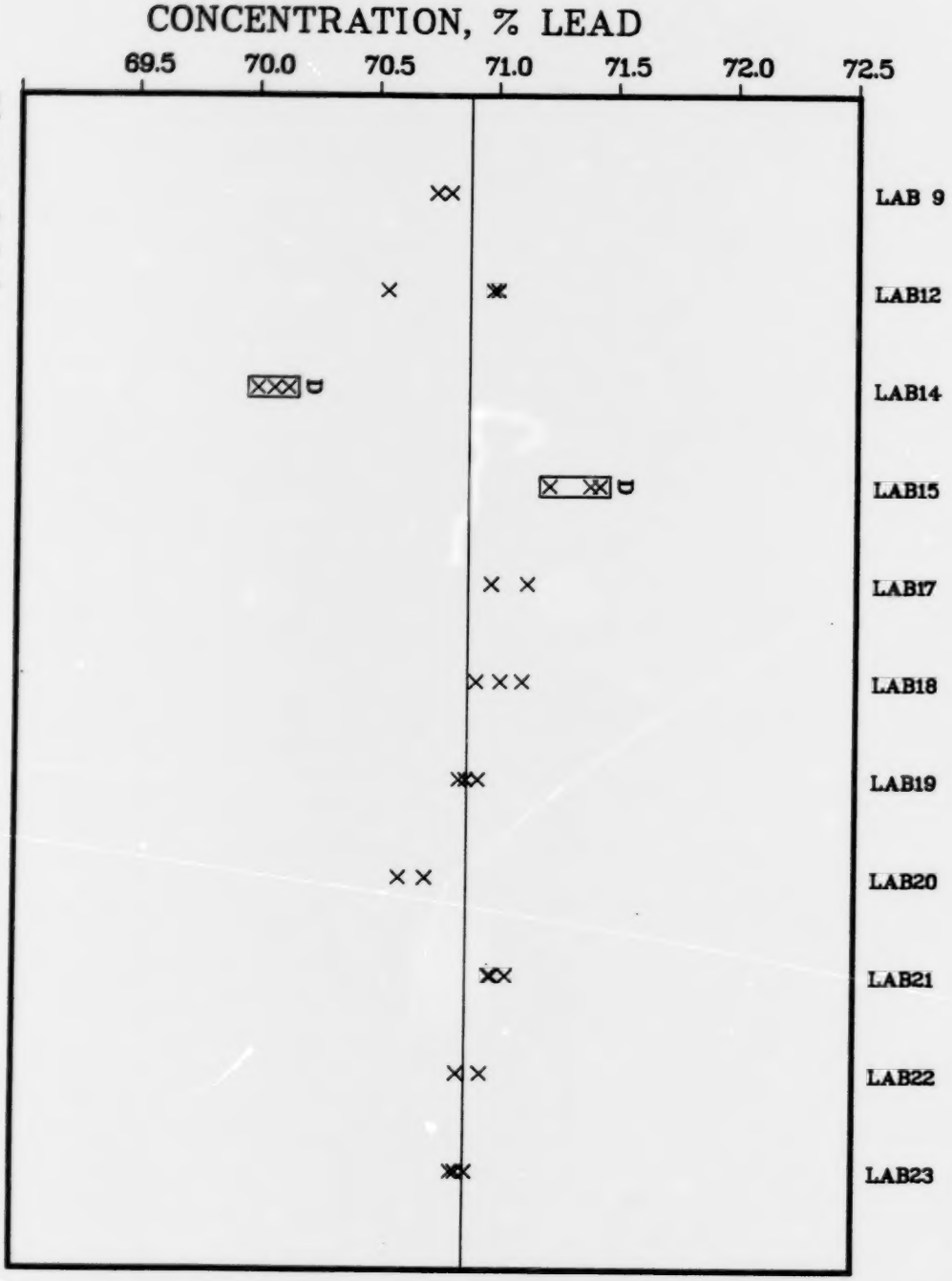

Figure 2.2.4

ISO/TC 183/WG 5A —— LEAD IN LEAD CONCENTRATES —— METHOD WG 5A-2

SAMPLE: 85-15 NORTH BROKEN HILL LEAD WT %

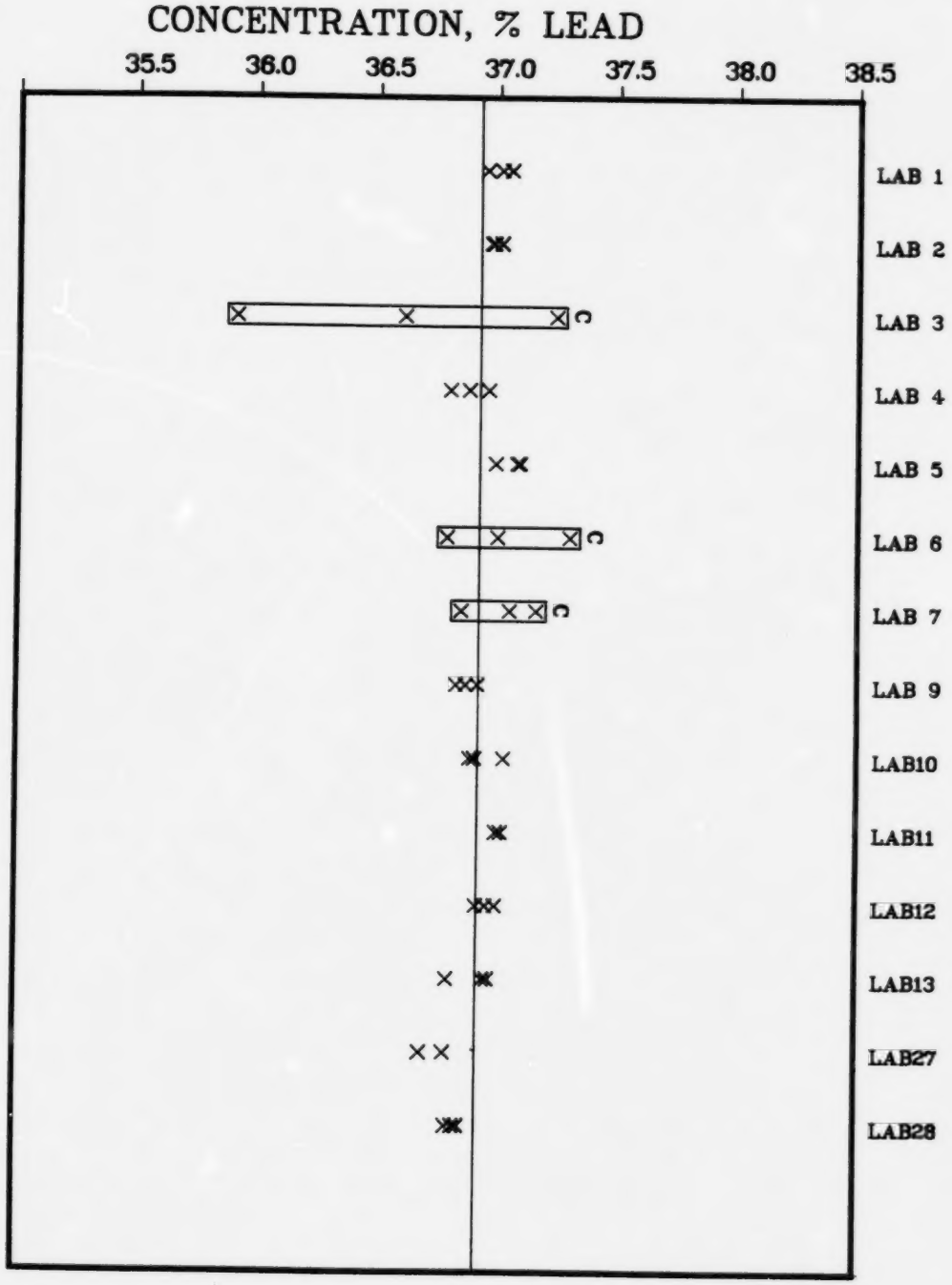

Figure 2.3.1

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-3

SAMPLE 85-12 MINERALS,MIN & MET LEAD WT %

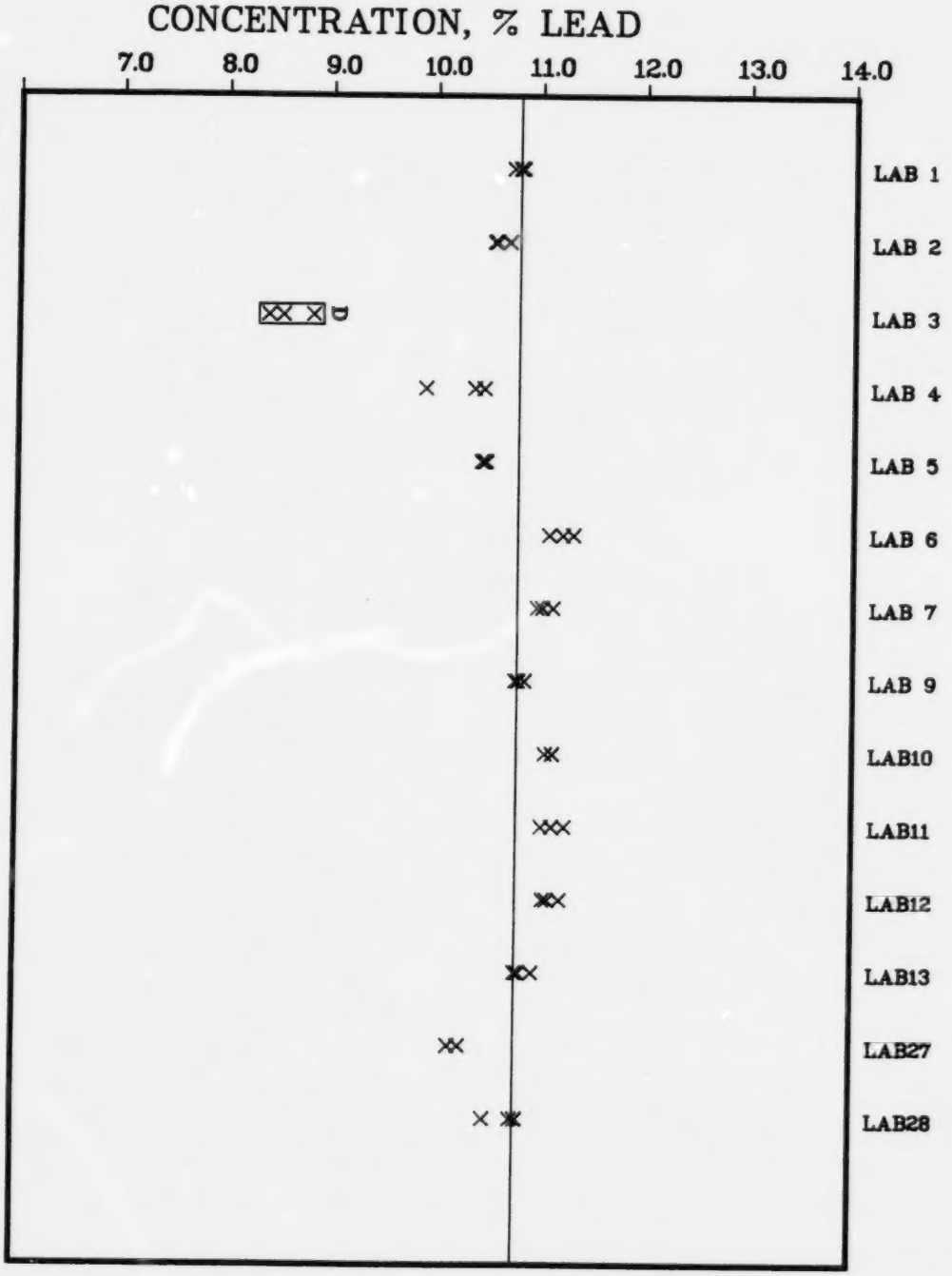

Figure 2.3.2

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-3

SAMPLE: 85-13 CLEVELAND TIN-LEAD LEAD WT %

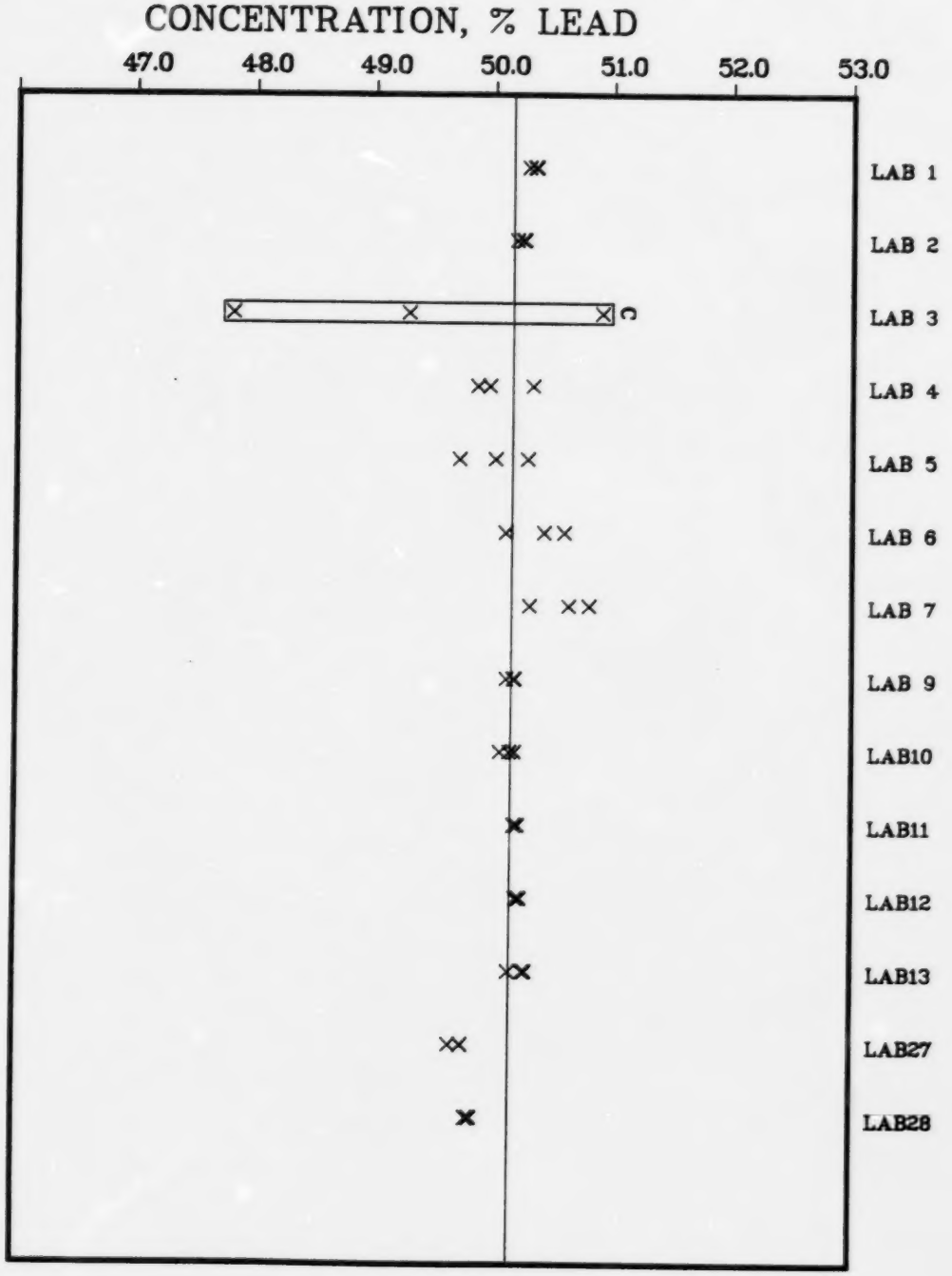

Figure 2.3.3

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-3

SAMPLE: 85-14 ELURA CONC LEAD WT %

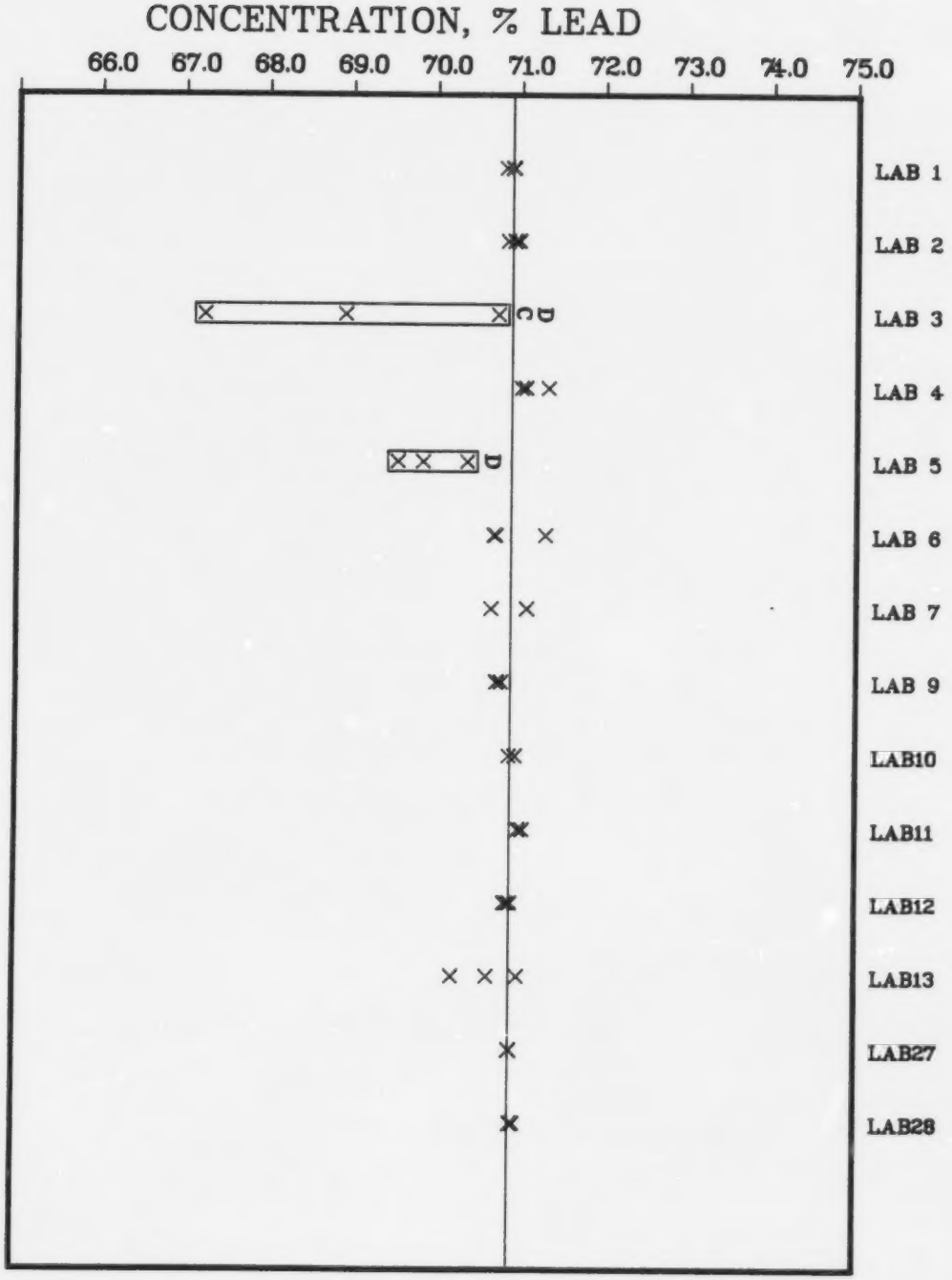

Figure 2.3.4

ISO/TC 183/WG 5A —— LEAD IN LEAD CONCENTRATES —— METHOD WG 5A-3

SAMPLE: 85-15 NORTH BROKEN HILL LEAD WT %

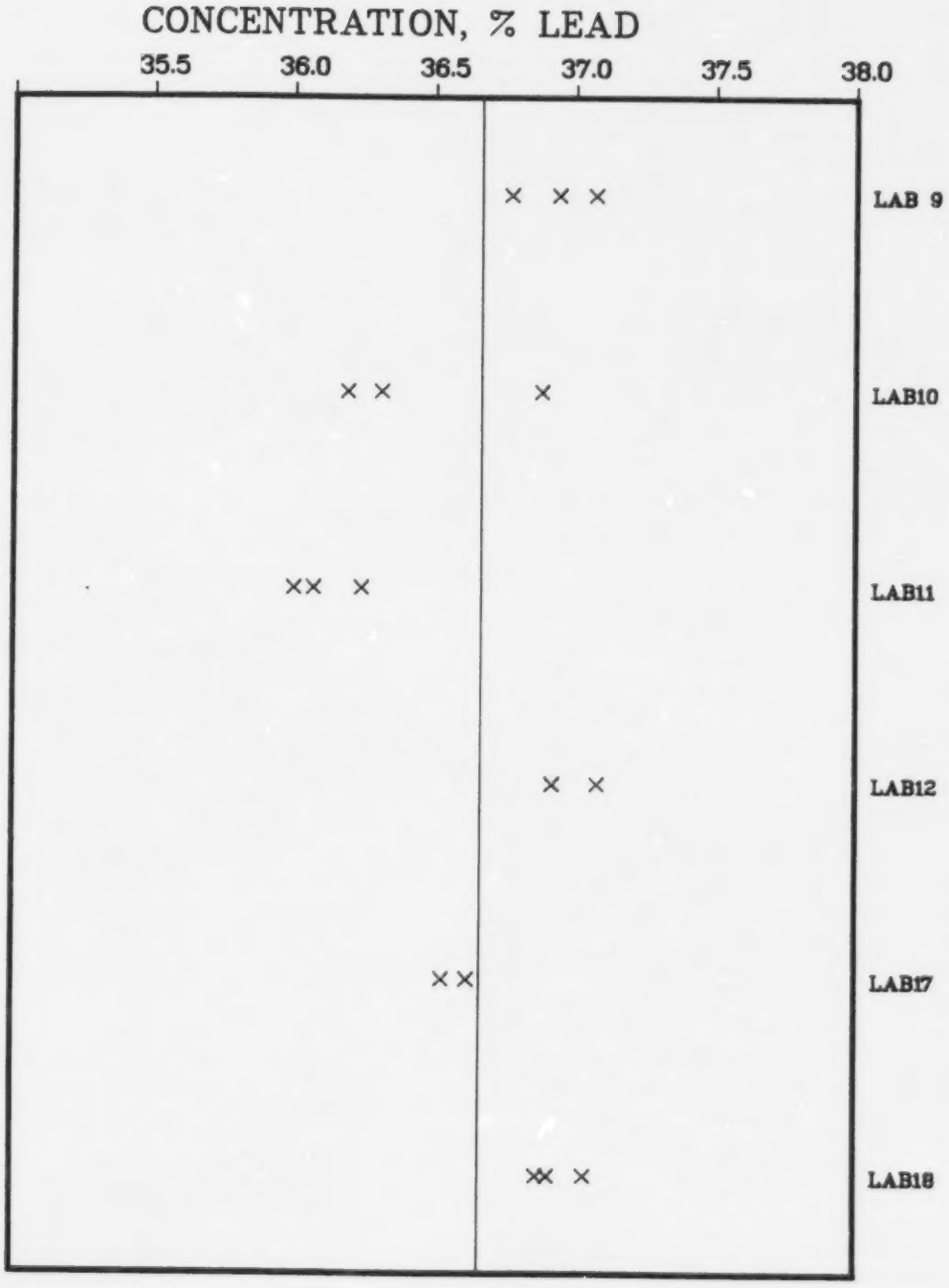

Figure 2.4.1

ISO/TC 183/WG 5A —— LEAD IN LEAD CONCENTRATES —— METHOD WG 5A-4

SAMPLE: 85-12 MINERALSMIN & MET LEAD WT %

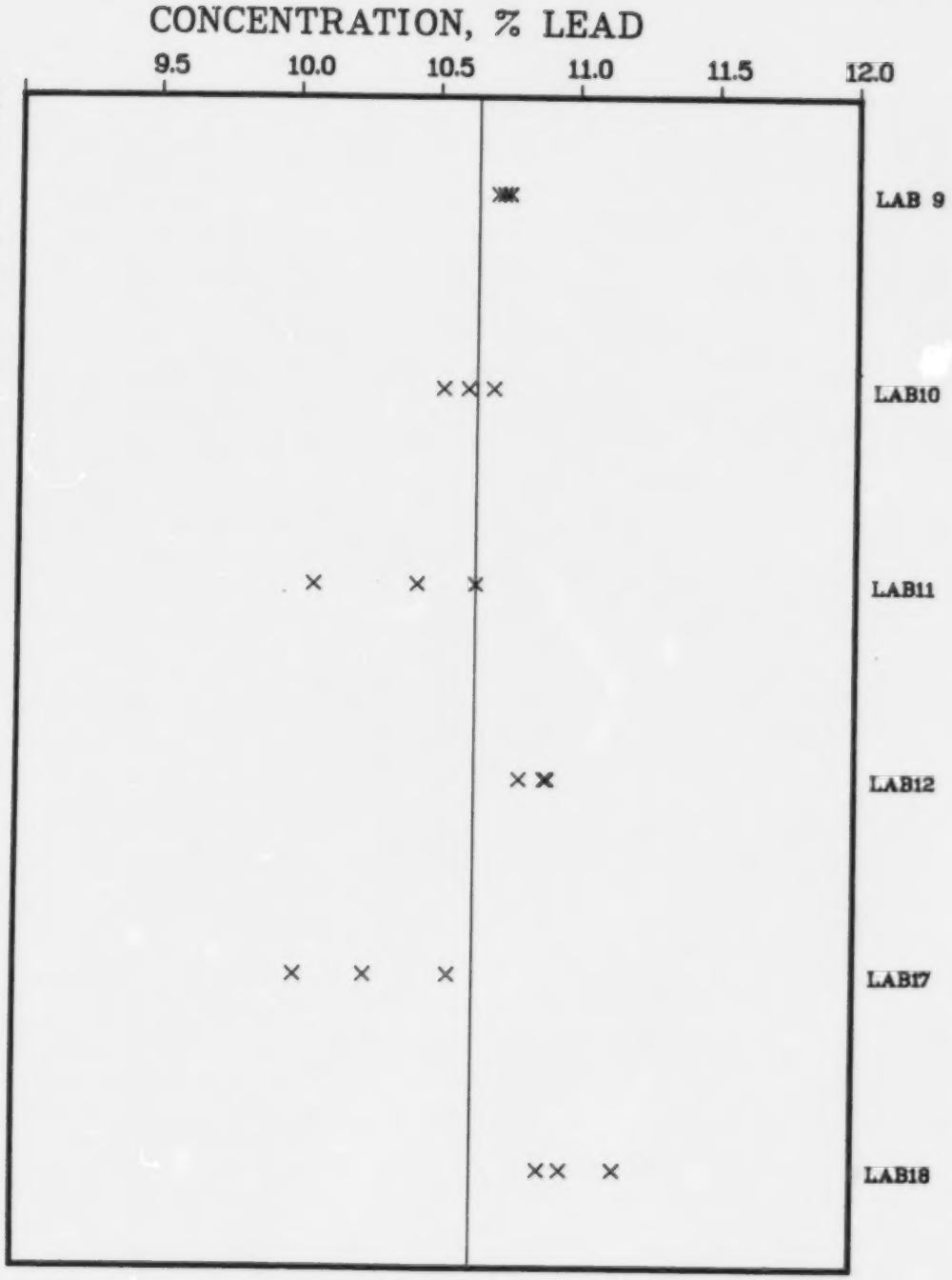

Figure 2.4.2

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-4

SAMPLE: 85-13 CLEVELAND TIN-LEAD LEAD WT %

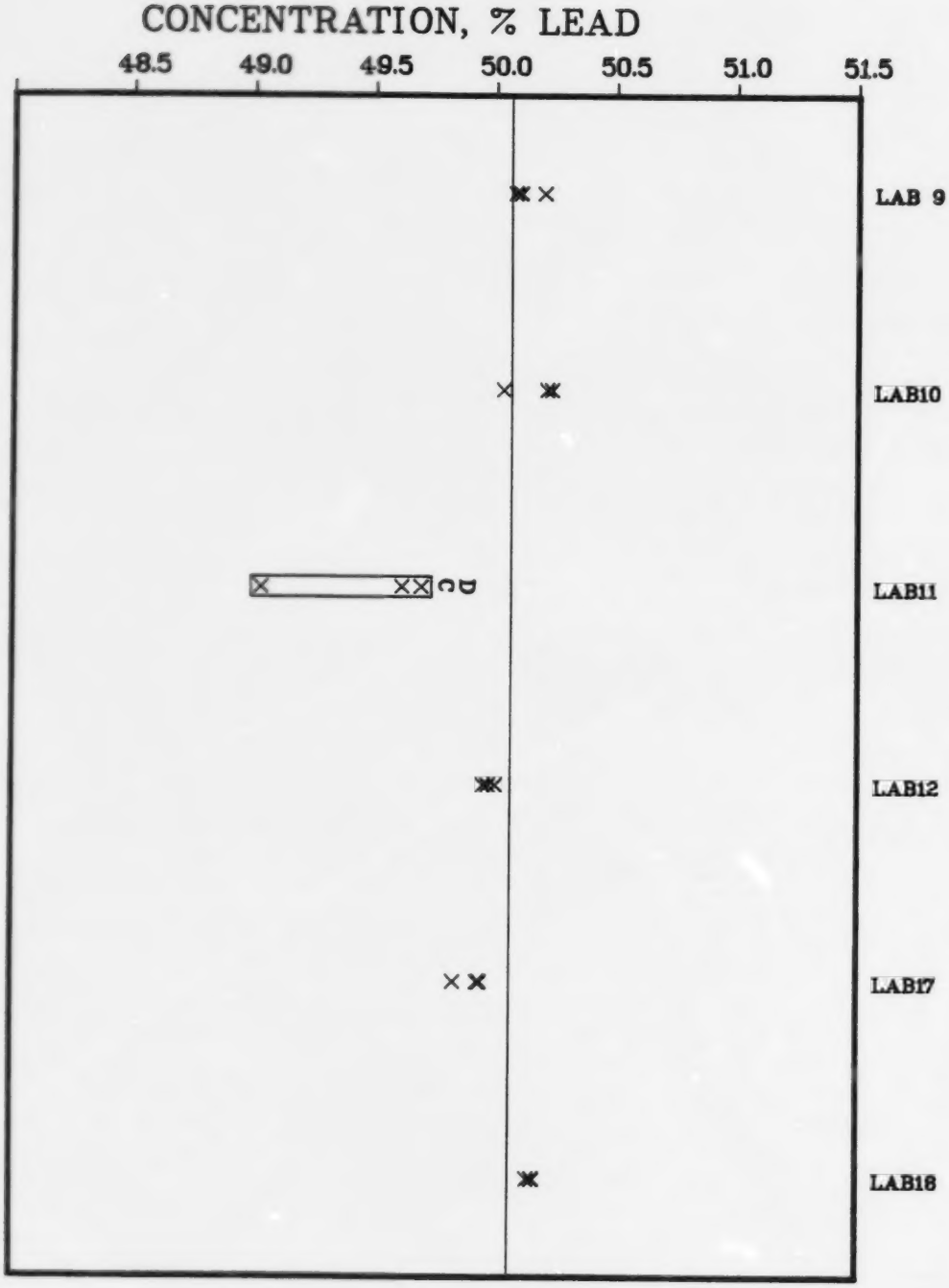

Figure 2.4.3

ISO/TC 183/WG 5A —— LEAD IN LEAD CONCENTRATES —— METHOD WG 5A-4

SAMPLE 85-14 ELURA CONC LEAD WT %

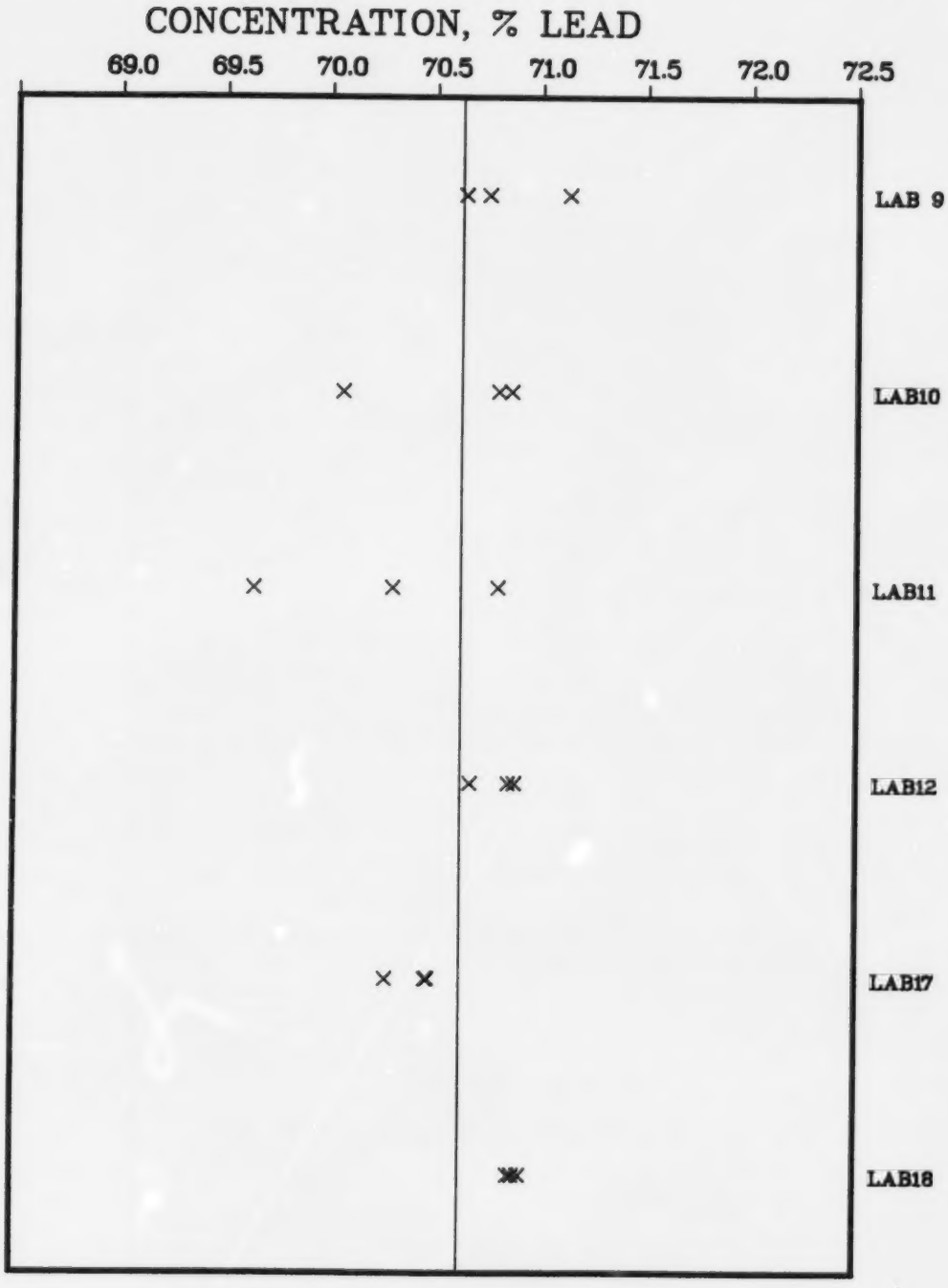

Figure 2.4.4.

ISO/TC 183/WG 5A —— LEAD IN LEAD CONCENTRATES —— METHOD WG 5A-4

SAMPLE: 85-15 NORTH BROKEN HILL LEAD WT %

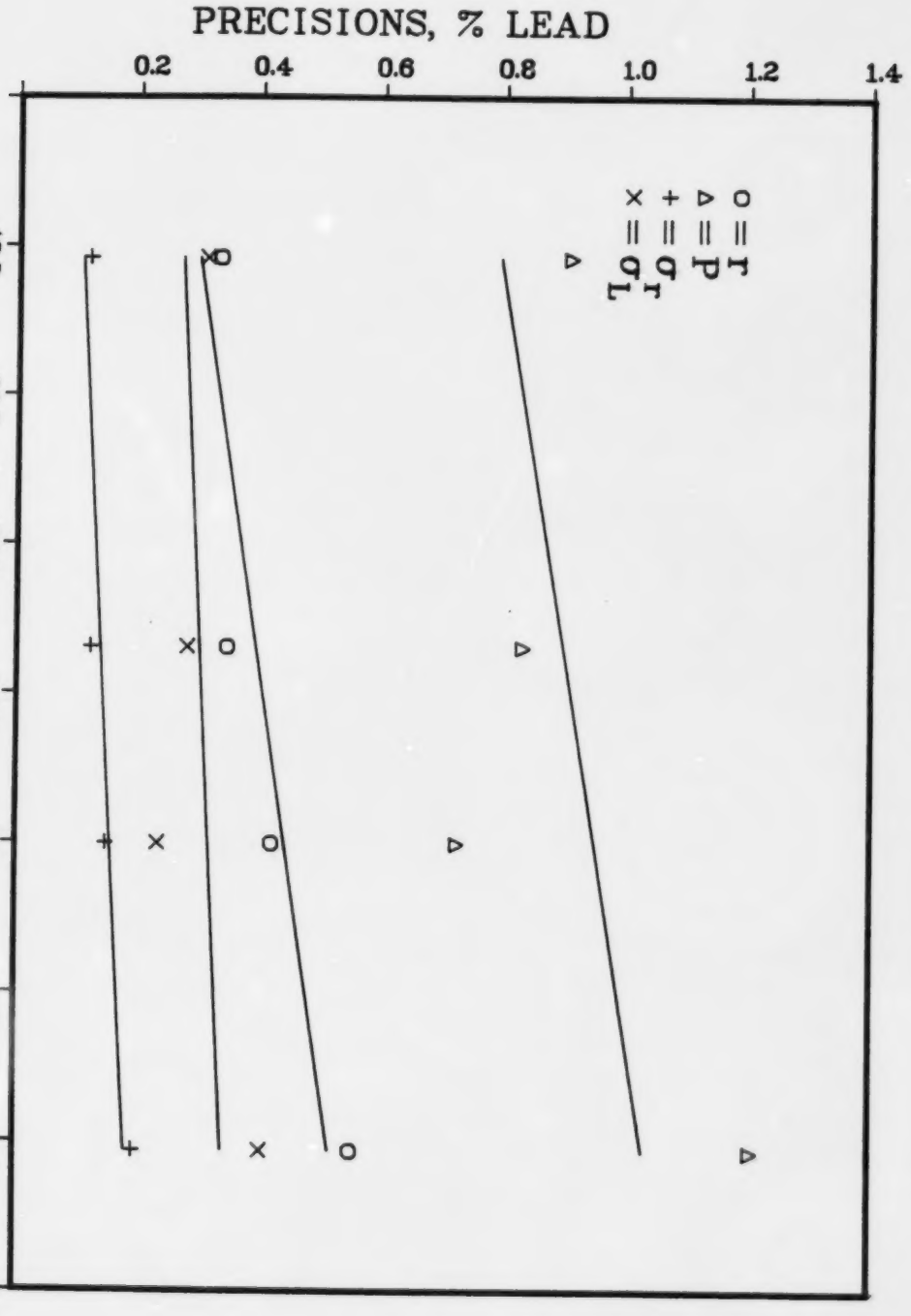

Figure 3.1

ISO/TC 183/WG 5A —— LEAD IN LEAD CONCENTRATES —— METHOD WG 5A-1

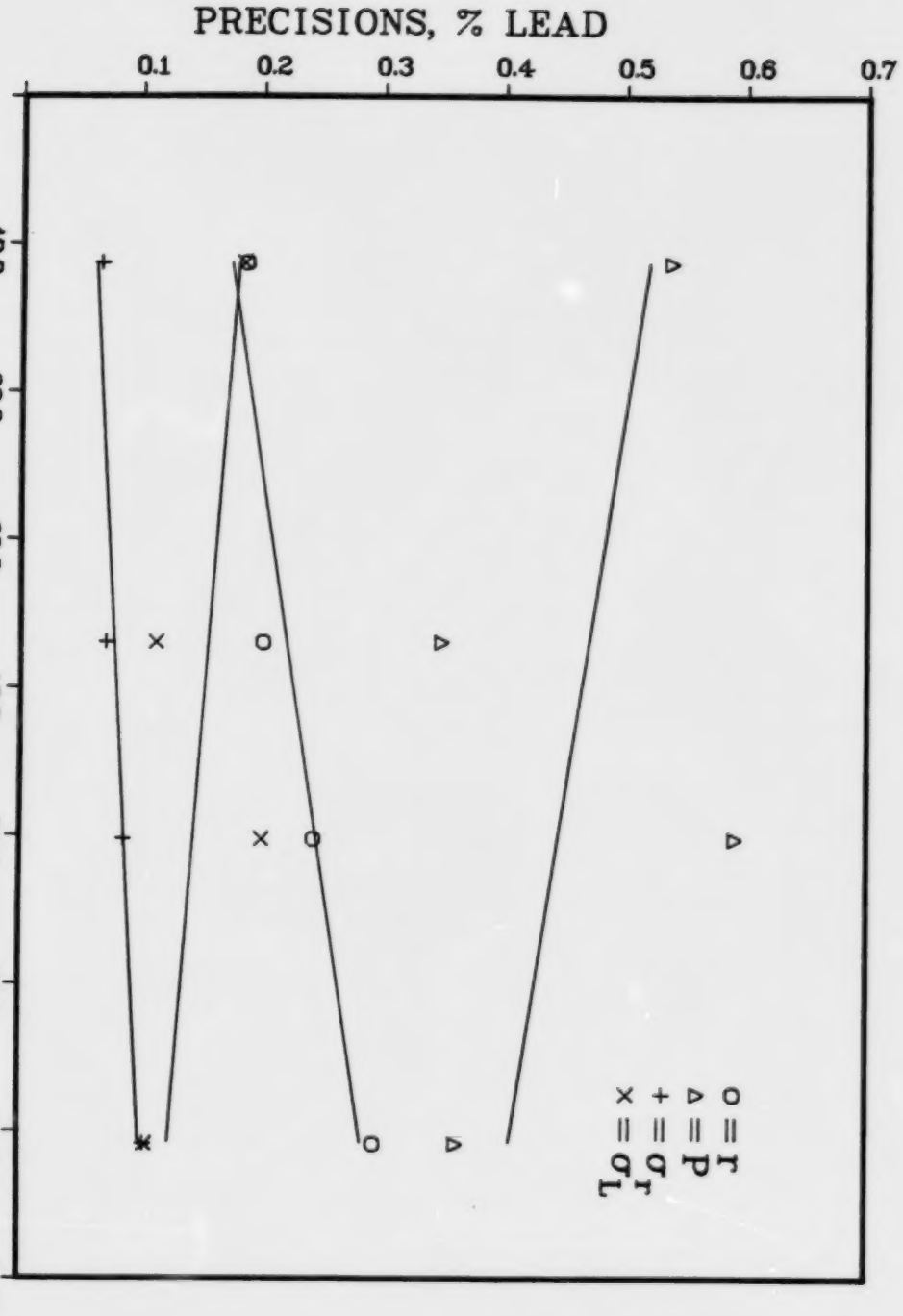

Figure 3.2

ISO/TC 183/WG 5A — LEAD IN LEAD CONCENTRATES — METHOD WG 5A-2

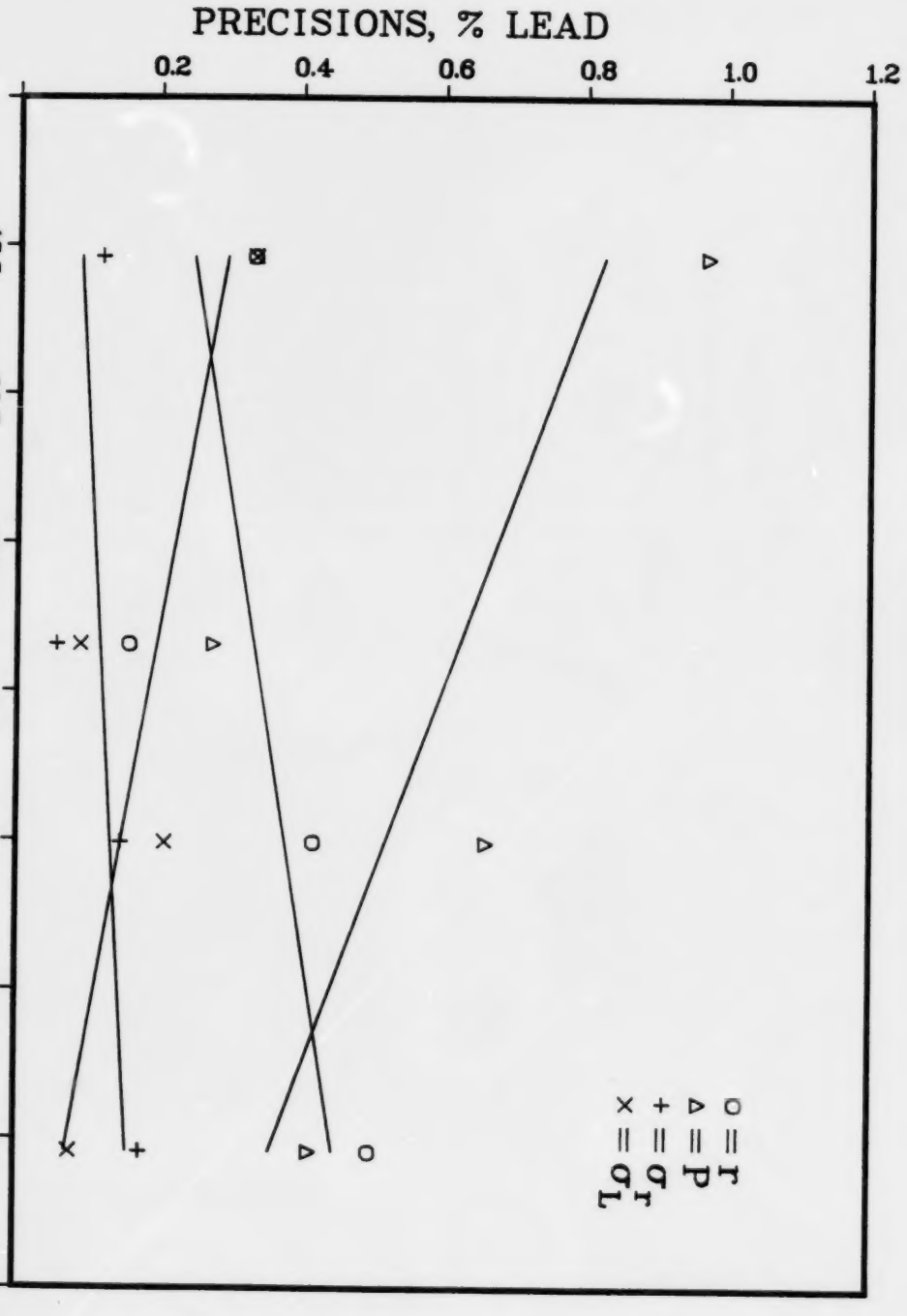

Figure 3.3

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-3

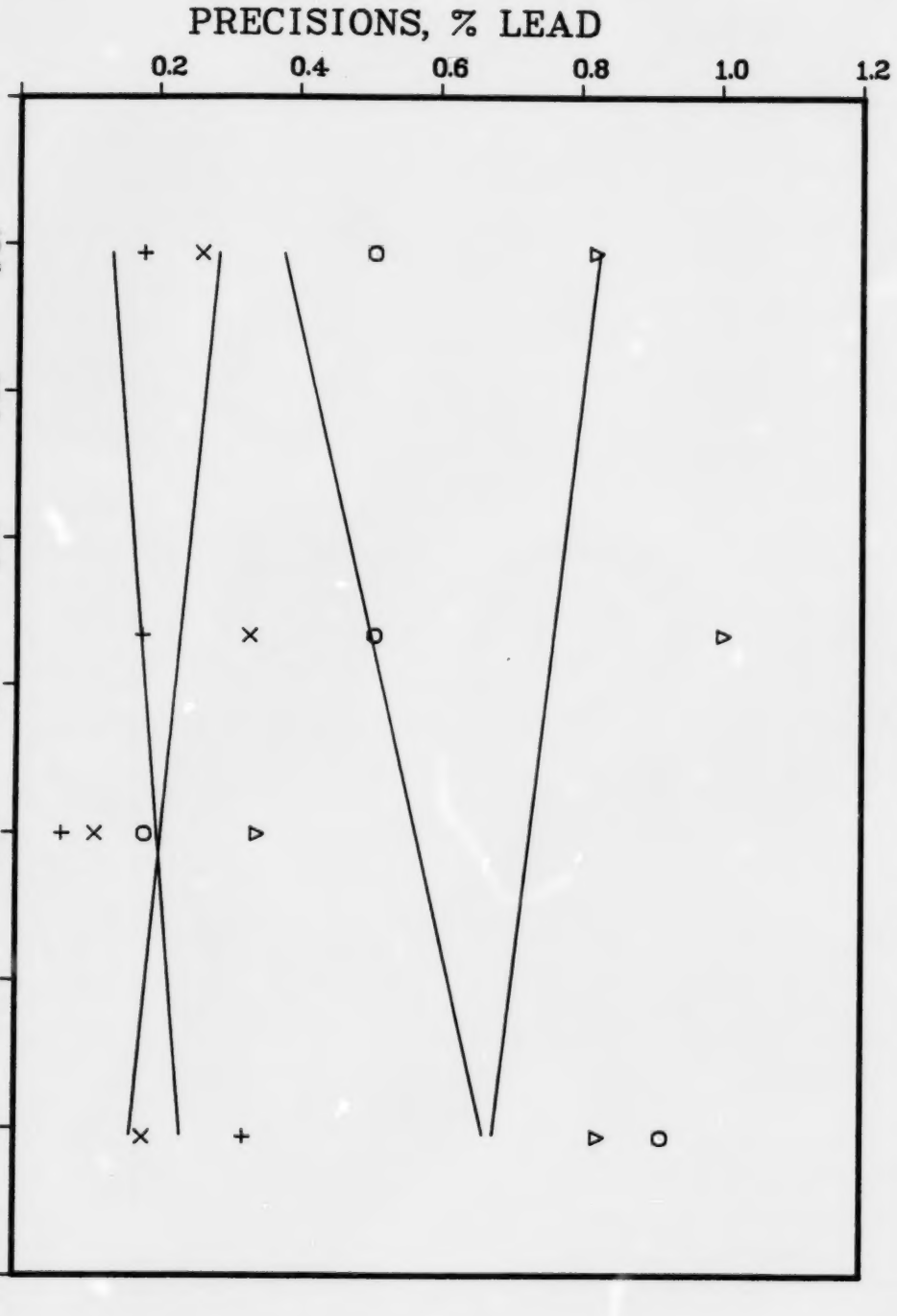

Figure 3.4

ISO/TC 183/WG 5A ---- LEAD IN LEAD CONCENTRATES ---- METHOD WG 5A-4

ISO/TC 183/WG 5A

DETERMINATION OF LEAD IN LEAD CONCENTRATES STATISTICAL EVALUATION OF INTERNATIONAL TEST DATA 1984-1986

Appendix A

Detailed Computation of the Analytical Data

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-1
SAMPLE: 85-12 MINERALS,MIN & MET LEAD WT %

LABORATORY NO.	COUNTRY	BOTTLE NO.	ANALYTICAL RESULTS LEAD			LAB MEAN	LAB VARIANCE
1	LAB 1	1	36.9900	36.9000	36.9000	36.93000	.2700E-02
2	LAB 2	1	36.5500	36.6900	36.7900	36.67667	.1453E-01
3	LAB 3	1	37.4800	37.5000	37.5500	37.51000	.1300E-02
4	LAB 4	1	37.0700	37.2600	37.3800	37.23667	.2443E-01
5	LAB 5	1	36.9400	37.0100	37.0700	37.00667	.4233E-02
6	LAB 6	1	36.5200	36.7200	36.7700	36.67000	.1750E-01
7	LAB 7	1	36.9900	36.9200	36.8500	36.92000	.4900E-02
8	LAB 8	1	37.8900	38.4900	38.5900	38.32333	.1433E+00
9	LAB 9	1	36.9800	37.0100	36.9300	36.97333	.1633E-02
10	LAB11	1	36.8800	37.2700	36.8800	37.01000	.5070E-01
11	LAB13	1	36.4600	36.7400	36.6800	36.62667	.2173E-01
12	LAB14	1	37.2300	37.3000	37.1300	37.22000	.7300E-02
13	LAB15	1	37.0000	37.2500	37.2000	37.15000	.1750E-01
14	LAB23	1	36.3000	36.5100	36.6100	36.47333	.2503E-01

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-1
SAMPLE: 85-12 MINERALS,MIN & MET LEAD WT %

BARTLETT'S TEST FOR HOMOGENEITY OF LABORATORY VARIANCE

CALCULATED STATISTIC	18.623
CHI-SQUARE(.95,13)	22.367

VARIANCE IS HOMOGENEOUS
(COCHRAN'S TEST NOT PERFORMED)

DIXON'S TEST FOR LABORATORY MEANS (ALPHA=.05)

LAB 8 R = .657 D-CRIT(14) = .587

LIST OF LABORATORIES WHOSE RESULTS WERE NOT USED FOR ONE-WAY ANOVA

LAB 8 DIXON'S TEST FOR LABORATORY MEANS

LIST OF INDIVIDUAL OUTLIERS DETECTED BY DIXON'S TEST WITHIN-LABORATORIES

NONE REJECTED

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-1
SAMPLE: 85-12 MINERALS,MIN & MET LEAD WT %

ONE-WAY ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	D.F.	SUM OF SQUARES	MEAN SQUARE
BETWEEN LABS	12	.30059436E+01	.25049530E+00
WITHIN LABS	26	.38700000E+00	.14884615E-01
TOTAL	38	.33929436E+01	

REPEATABILITY VARIANCE	.14884615E-01
REPEATABILITY STD. DEV.	.12200252
BETWEEN-LABORATORIES VARIANCE	.78536895E-01
BETWEEN-LABORATORIES STD. DEV.	.28024435
REPEATABILITY	.34526714
PERMISSIBLE TOLERANCE BETWEEN LABS	.82981855
GRAND MEAN	36.95410256
VARIANCE OF THE GRAND MEAN	.64229564E-02

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-1
SAMPLE: 85-13 CLEVELAND TIN-LEAD LEAD WT %

LABORATORY NO.	COUNTRY	BOTTLE NO.	ANALYTICAL RESULTS LEAD			LAB MEAN	LAB VARIANCE
1	LAB 1	1	11.0800	11.0700	10.9800	11.04333	.3033E-02
2	LAB 2	1	10.3400	10.5800	10.5200	10.48000	.1560E-01
3	LAB 3	1	10.6200	10.9600	10.6100	10.73000	.3970E-01
4	LAB 4	1	11.0400	11.1000	10.8300	10.99000	.2010E-01
5	LAB 5	1	11.0400	11.1300	11.0800	11.08333	.2033E-02
6	LAB 6	1	10.9000	10.7900	10.8600	10.85000	.3100E-02
7	LAB 7	1	10.7700	10.4800	10.7300	10.66000	.2470E-01
8	LAB 8	1	11.2700	11.2500	11.2800	11.26667	.2333E-03
9	LAB 9	1	11.0400	11.0800	10.9800	11.03333	.2533E-02
10	LAB11	1	10.3900	10.6100	10.4500	10.48333	.1293E-01
11	LAB13	1	10.7300	10.7500	10.9100	10.79667	.9733E-02
12	LAB14	1	10.9500	11.0100	11.1400	11.03333	.9433E-02
13	LAB15	1	10.9400	10.9600	10.6000	10.83333	.4093E-01
14	LAB23	1	9.8700	9.9200		9.89500	.1250E-02

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-1
SAMPLE: 85-13 CLEVELAND TIN-LEAD LEAD WT %

BARTLETT'S TEST FOR HOMOGENEITY OF LABORATORY VARIANCE

CALCULATED STATISTIC	15.699
CHI-SQUARE(.95,13)	22.367

VARIANCE IS HOMOGENEOUS
(COCHRAN'S TEST NOT PERFORMED)

DIXON'S TEST FOR LABORATORY MEANS (ALPHA=.05)

NONE REJECTED

LIST OF LABORATORIES WHOSE RESULTS WERE NOT USED FOR ONE-WAY ANOVA

ALL RESULTS WERE USED EXCEPT INDIVIDUAL REPLICATES LISTED BELOW

LIST OF INDIVIDUAL OUTLIERS DETECTED BY DIXON'S TEST WITHIN-LABORATORIES

NONE REJECTED

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-1
SAMPLE: 85-13 CLEVELAND TIN-LEAD LEAD WT %

ONE-WAY ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	D.F.	SUM OF SQUARES	MEAN SQUARE
BETWEEN LABS	13	.38200069E+01	.29384669E+00
WITHIN LABS	27	.36938333E+00	.13680864E-01
TOTAL	40	.41893902E+01	

REPEATABILITY VARIANCE	.13680864E-01
REPEATABILITY STD. DEV.	.11696523
BETWEEN-LABORATORIES VARIANCE	.95723322E-01
BETWEEN-LABORATORIES STD. DEV.	.30939186
REPEATABILITY	.33101159
PERMISSIBLE TOLERANCE BETWEEN LABS	.90632381
GRAND MEAN	10.82048780
VARIANCE OF THE GRAND MEAN	.72239366E-02

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-1
SAMPLE: 85-14 ELURA CONC LEAD WT %

LABORATORY NO.	COUNTRY	BOTTLE NO.	ANALYTICAL RESULTS LEAD			LAB MEAN	LAB VARIANCE
1	LAB 1	1	50.3000	50.3000	50.2800	50.29333	.1333E-03
2	LAB 2	1	49.8000	49.9200	50.0100	49.91000	.1110E-01
3	LAB 3	1	50.5000	49.7500	49.8900	50.04667	.1590E+00
4	LAB 4	1	50.2000	49.8300	50.1300	50.05333	.3863E-01
5	LAB 5	1	50.5200	50.4700	50.0000	50.33000	.8230E-01
6	LAB 6	1	49.8800	50.1200	49.8900	49.96333	.1843E-01
7	LAB 7	1	50.3200	50.2600	50.3200	50.30000	.1200E-02
8	LAB 8	1	50.2400	47.3200	49.2600	48.94000	.2208E+01
9	LAB 9	1	50.1800	50.1000	50.0600	50.11333	.3733E-02
10	LAB11	1	50.1700	50.3300	50.3400	50.28000	.9100E-02
11	LAB13	1	49.7700	49.8600	50.0000	49.87667	.1343E-01
12	LAB14	1	49.7300	49.6400	50.1000	49.82333	.5943E-01
13	LAB15	1	50.1900	50.2800	50.4300	50.30000	.1470E-01
14	LAB23	1	49.4300	49.5700	49.6400	49.54667	.1143E-01

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-1
SAMPLE: 85-14 ELURA CONC LEAD WT %

BARTLETT'S TEST FOR HOMOGENEITY OF LABORATORY VARIANCE

CALCULATED STATISTIC	57.104
CHI-SQUARE(.95,13)	22.367

VARIANCE IS INHOMOGENEOUS

COCHRAN'S TEST FOR LABORATORY VARIANCE (ALPHA=.05)

LAB 8	C-CALC = .839	C-CRIT(3,14) = .352
LAB 3	C-CALC = .376	C-CRIT(3,13) = .371

DIXON'S TEST FOR LABORATORY MEANS (ALPHA=.05)

LAB 8	R = .650	D-CRIT(14) = .587

LIST OF LABORATORIES WHOSE RESULTS WERE NOT USED FOR ONE-WAY ANOVA

LAB 3	COCHRAN'S TEST FOR LABORATORY VARIANCE
LAB 8	DIXON'S TEST FOR MEANS AND COCHRAN'S TEST FOR VARIANCE

LIST OF INDIVIDUAL OUTLIERS DETECTED BY DIXON'S TEST WITHIN-LABORATORIES

NONE REJECTED

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-1
SAMPLE: 85-14 ELURA CONC LEAD WT %

ONE-WAY ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	D.F.	SUM OF SQUARES	MEAN SQUARE
BETWEEN LABS	11	.20352083E+01	.18501894E+00
WITHIN LABS	24	.52726667E+00	.21969444E-01
TOTAL	35	.25624750E+01	

REPEATABILITY VARIANCE	.21969444E-01
REPEATABILITY STD. DEV.	.14822093
BETWEEN-LABORATORIES VARIANCE	.54349832E-01
BETWEEN-LABORATORIES STD. DEV.	.23313050
REPEATABILITY	.41946524
PERMISSIBLE TOLERANCE BETWEEN LABS	.72336568
GRAND MEAN	50.06583333
VARIANCE OF THE GRAND MEAN	.51394150E-02

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-1
SAMPLE: 85-15 NORTH BROKEN HILL LEAD WT %

LABORATORY NO.	COUNTRY	BOTTLE NO.	ANALYTICAL RESULTS LEAD			LAB MEAN	LAB VARIANCE
1	LAB 1	1	70.9300	70.9400	70.8800	70.91667	.1033E-02
2	LAB 2	1	70.5000	70.7100	70.7000	70.63667	.1403E-01
3	LAB 3	1	70.8100	71.4500	71.3800	71.21333	.1232E+00
4	LAB 4	1	70.8000	70.4500	71.0000	70.75000	.7750E-01
5	LAB 5	1	69.7400	69.8700	70.2100	69.94000	.5890E-01
6	LAB 6	1	70.2200	70.6600	70.6600	70.51333	.6453E-01
7	LAB 7	1	70.5300	70.6900	70.6900	70.63667	.8533E-02
8	LAB 8	1	67.0300	67.7900	66.0700	66.96333	.7429E+00
9	LAB 9	1	70.4900	70.8100	70.7200	70.67333	.2723E-01
10	LAB11	1	70.8100	70.9700	70.6000	70.79333	.3443E-01
11	LAB13	1	69.5800	69.9400	69.9400	69.82000	.4320E-01
12	LAB14	1	71.0900	71.2600	71.4700	71.27333	.3623E-01
13	LAB15	1	70.5500	70.6100	70.5100	70.55667	.2533E-02
14	LAB23	1	70.2900	70.3700	70.3900	70.35000	.2800E-02

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-1
SAMPLE: 85-15 NORTH BROKEN HILL LEAD WT %

BARTLETT'S TEST FOR HOMOGENEITY OF LABORATORY VARIANCE

CALCULATED STATISTIC	30.115
CHI-SQUARE(.95,13)	22.367

VARIANCE IS INHOMOGENEOUS

COCHRAN'S TEST FOR LABORATORY VARIANCE (ALPHA=.05)

LAB 8 C-CALC = .601 C-CRIT(3,14) = .352

DIXON'S TEST FOR LABORATORY MEANS (ALPHA=.05)

LAB 8 R = .753 D-CRIT(14) = .587

LIST OF LABORATORIES WHOSE RESULTS WERE NOT USED FOR ONE-WAY ANOVA

LAB 8 DIXON'S TEST FOR MEANS AND COCHRAN'S TEST FOR VARIANCE

LIST OF INDIVIDUAL OUTLIERS DETECTED BY DIXON'S TEST WITHIN-LABORATORIES

NONE REJECTED

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-1
SAMPLE: 85-15 NORTH BROKEN HILL LEAD WT %

ONE-WAY ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	D.F.	SUM OF SQUARES	MEAN SQUARE
BETWEEN LABS	12	.63237590E+01	.52697991E+00
WITHIN LABS	26	.98840000E+00	.38015385E-01
TOTAL	38	.73121590E+01	

REPEATABILITY VARIANCE	.38015385E-01
REPEATABILITY STD. DEV.	.19497534
BETWEEN-LABORATORIES VARIANCE	.16298818E+00
BETWEEN-LABORATORIES STD. DEV.	.40371794
REPEATABILITY	.55178022
PERMISSIBLE TOLERANCE BETWEEN LABS	1.20730556
GRAND MEAN	70.62102564
VARIANCE OF THE GRAND MEAN	.13512305E-01

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-2
SAMPLE: 85-12 MINERALS,MIN & MET LEAD WT %

LABORATORY NO.	COUNTRY	BOTTLE NO.	ANALYTICAL RESULTS LEAD			LAB MEAN	LAB VARIANCE
1	LAB 9	1	37.1400	37.1400	37.1200	37.13333	.1333E-03
2	LAB12	1	37.0400	36.9800	37.0800	37.03333	.2533E-02
3	LAB14	1	36.9300	36.8500	36.7700	36.85000	.6400E-02
4	LAB15	1	37.4200	37.5500	37.4400	37.47000	.4900E-02
5	LAB17	1	37.1400	37.0600	37.1200	37.10667	.1733E-02
6	LAB18	1	36.9000	36.9500	37.1100	36.98667	.1203E-01
7	LAB19	1	36.8100	36.8600	36.8700	36.84667	.1033E-02
8	LAB20	1	36.7500	36.7500	36.9500	36.81667	.1333E-01
9	LAB21	1	36.8700	36.8800	37.0300	36.92667	.8033E-02
10	LAB22	1	36.7600	36.8600	36.8600	36.82667	.3333E-02
11	LAB23	1	36.8200	36.8300	36.9000	36.85000	.1900E-02

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-2
SAMPLE: 85-12 MINERALS,MIN & MET LEAD WT %

BARTLETT'S TEST FOR HOMOGENEITY OF LABORATORY VARIANCE

CALCULATED STATISTIC	9.860
CHI-SQUARE(.95,10)	18.311

VARIANCE IS HOMOGENEOUS
(COCHRAN'S TEST NOT PERFORMED)

DIXON'S TEST FOR LABORATORY MEANS (ALPHA=.05)

LAB15 R = .523 D-CRIT(11) = .502

LIST OF LABORATORIES WHOSE RESULTS WERE NOT USED FOR ONE-WAY ANOVA

LAB15 DIXON'S TEST FOR LABORATORY MEANS

LIST OF INDIVIDUAL OUTLIERS DETECTED BY DIXON'S TEST WITHIN-LABORATORIES

NONE REJECTED

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-2
SAMPLE: 85-12 MINERALS,MIN & MET LEAD WT %

ONE-WAY ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	D.F.	SUM OF SQUARES	MEAN SQUARE
BETWEEN LABS	9	.38740333E+00	.43044815E-01
WITHIN LABS	20	.10093333E+00	.50466667E-02
TOTAL	29	.48833667E+00	

REPEATABILITY VARIANCE	.50466667E-02
REPEATABILITY STD. DEV.	.07103989
BETWEEN-LABORATORIES VARIANCE	.12666049E-01
BETWEEN-LABORATORIES STD. DEV.	.11254354
REPEATABILITY	.20104290
PERMISSIBLE TOLERANCE BETWEEN LABS	.34878396
GRAND MEAN	36.93766667
VARIANCE OF THE GRAND MEAN	.14348272E-02

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-2
SAMPLE: 85-13 CLEVELAND TIN-LEAD LEAD WT %

BARTLETT'S TEST FOR HOMOGENEITY OF LABORATORY VARIANCE

CALCULATED STATISTIC	13.090
CHI-SQUARE(.95,10)	18.311

VARIANCE IS HOMOGENEOUS
(COCHRAN'S TEST NOT PERFORMED)

DIXON'S TEST FOR LABORATORY MEANS (ALPHA=.05)

LAB14 R = .554 D-CRIT(11) = .502

LIST OF LABORATORIES WHOSE RESULTS WERE NOT USED FOR ONE-WAY ANOVA

LAB14 DIXON'S TEST FOR LABORATORY MEANS

LIST OF INDIVIDUAL OUTLIERS DETECTED BY DIXON'S TEST WITHIN-LABORATORIES

NONE REJECTED

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-2
SAMPLE: 85-13 CLEVELAND TIN-LEAD LEAD WT %

LABORATORY NO.	COUNTRY	BOTTLE NO.	ANALYTICAL RESULTS LEAD			LAB MEAN	LAB VARIANCE
1	LAB 9	1	11.0000	11.0200	11.0400	11.02000	.4000E-03
2	LAB12	1	10.9900	10.9500	11.0100	10.98333	.9333E-03
3	LAB14	1	12.2300	12.4000	12.1300	12.25333	.1863E-01
4	LAB15	1	11.5400	11.6600	11.5100	11.57000	.6300E-02
5	LAB17	1	11.5000	11.4600	11.5000	11.48667	.5333E-03
6	LAB18	1	11.2800	11.2900	11.3400	11.30333	.1033E-02
7	LAB19	1	11.2100	11.3500	11.4500	11.33667	.1453E-01
8	LAB20	1	11.3500	11.4600	11.5600	11.45667	.1103E-01
9	LAB21	1	11.1900	11.2600	11.3000	11.25000	.3100E-02
10	LAB22	1	11.1800	11.2800	11.2800	11.24667	.3333E-02
11	LAB23	1	11.2200	11.2900	11.3000	11.27000	.1900E-02

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-2
SAMPLE: 85-13 CLEVELAND TIN-LEAD LEAD WT %

ONE-WAY ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	D.F.	SUM OF SQUARES	MEAN SQUARE
BETWEEN LABS	9	.95393667E+00	.10599296E+00
WITHIN LABS	20	.86200000E-01	.43100000E-02
TOTAL	29	.10401367E+01	

REPEATABILITY VARIANCE	.43100000E-02
REPEATABILITY STD. DEV.	.06565059
BETWEEN-LABORATORIES VARIANCE	.33894321E-01
BETWEEN-LABORATORIES STD. DEV.	.18410410
REPEATABILITY	.18579117
PERMISSIBLE TOLERANCE BETWEEN LABS	.53732244
GRAND MEAN	11.29233333
VARIANCE OF THE GRAND MEAN	.35330988E-02

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-2
SAMPLE: 85-14 ELURA CONC LEAD WT %

LABORATORY NO.	COUNTRY	BOTTLE NO.	ANALYTICAL RESULTS LEAD			LAB MEAN	LAB VARIANCE
1	LAB 9	1	50.0600	50.0800	50.0600	50.06667	.1333E-03
2	LAB12	1	50.2400	50.2000	50.2500	50.23000	.7000E-03
3	LAB14	1	49.3200	49.8900	49.7100	49.64000	.8490E-01
4	LAB15	1	50.4800	50.7100	50.7700	50.65333	.2343E-01
5	LAB17	1	50.4500	50.4100	50.4100	50.42333	.5333E-03
6	LAB18	1	50.1000	50.3200	50.4100	50.27667	.2543E-01
7	LAB19	1	50.1700	50.2100	50.2500	50.21000	.1600E-02
8	LAB20	1	49.8600	49.9600	49.9600	49.92667	.3333E-02
9	LAB21	1	50.1800	50.2300	50.2400	50.21667	.1033E-02
10	LAB22	1	50.2200	50.2200	50.2200	50.22000	.0000E+00
11	LAB23	1	49.9200	49.9700	50.1700	50.02000	.1750E-01

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-2
SAMPLE: 85-14 ELURA CONC LEAD WT %

BARTLETT'S TEST FOR HOMOGENEITY OF LABORATORY VARIANCE

CALCULATED STATISTIC	25.754
CHI-SQUARE(.95, 9)	16.925

VARIANCE IS INHOMOGENEOUS

COCHRAN'S TEST FOR LABORATORY VARIANCE (ALPHA=.05)

LAB14 C-CALC = .535 C-CRIT(3,10) = .445

DIXON'S TEST FOR LABORATORY MEANS (ALPHA=.05)

NONE REJECTED

LIST OF LABORATORIES WHOSE RESULTS WERE NOT USED FOR ONE-WAY ANOVA

LAB14 COCHRAN'S TEST FOR LABORATORY VARIANCE

LIST OF INDIVIDUAL OUTLIERS DETECTED BY DIXON'S TEST WITHIN-LABORATORIES

NONE REJECTED

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-2
SAMPLE: 85-14 ELURA CONC LEAD WT %

ONE-WAY ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	D.F.	SUM OF SQUARES	MEAN SQUARE
BETWEEN LABS	9	.11457367E+01	.12730407E+00
WITHIN LABS	20	.14740000E+00	.73700000E-02
TOTAL	29	.12931367E+01	

REPEATABILITY VARIANCE	.73700000E-02
REPEATABILITY STD. DEV.	.08584870
BETWEEN-LABORATORIES VARIANCE	.39978025E-01
BETWEEN-LABORATORIES STD. DEV.	.19994505
REPEATABILITY	.24295183
PERMISSIBLE TOLERANCE BETWEEN LABS	.59134829
GRAND MEAN	50.22433333
VARIANCE OF THE GRAND MEAN	.42434691E-02

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-2
SAMPLE: 85-15 NORTH BROKEN HILL LEAD WT %

LABORATORY NO.	COUNTRY	BOTTLE NO.	ANALYTICAL RESULTS LEAD			LAB MEAN	LAB VARIANCE
1	LAB 9	1	70.8000	70.7400	70.7400	70.76000	.1200E-02
2	LAB12	1	71.0000	70.9800	70.5400	70.84000	.6760E-01
3	LAB14	1	70.0000	70.0700	70.1300	70.06667	.4233E-02
4	LAB15	1	71.3900	71.4300	71.2200	71.34667	.1243E-01
5	LAB17	1	71.1300	70.9800	70.9800	71.03000	.7500E-02
6	LAB18	1	70.9200	71.0200	71.1100	71.01667	.9033E-02
7	LAB19	1	70.8500	70.8800	70.9300	70.88667	.1633E-02
8	LAB20	1	70.6000	70.7100	70.7100	70.67333	.4033E-02
9	LAB21	1	70.9800	70.9900	71.0500	71.00667	.1433E-02
10	LAB22	1	70.8500	70.8500	70.9500	70.88333	.3333E-02
11	LAB23	1	70.8300	70.8500	70.8900	70.85667	.9333E-03

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-2
SAMPLE: 85-15 NORTH BROKEN HILL LEAD WT %

BARTLETT'S TEST FOR HOMOGENEITY OF LABORATORY VARIANCE

CALCULATED STATISTIC	16.423
CHI-SQUARE(.95,10)	18.311

VARIANCE IS HOMOGENEOUS
(COCHRAN'S TEST NOT PERFORMED)

DIXON'S TEST FOR LABORATORY MEANS (ALPHA=.05)

LAB14	R =	.630	D-CRIT(11) =	.502
LAB15	R =	.540	D-CRIT(10) =	.530

LIST OF LABORATORIES WHOSE RESULTS WERE NOT USED FOR ONE-WAY ANOVA

LAB14	DIXON'S TEST FOR LABORATORY MEANS
LAB15	DIXON'S TEST FOR LABORATORY MEANS

LIST OF INDIVIDUAL OUTLIERS DETECTED BY DIXON'S TEST WITHIN-LABORATORIES

NONE REJECTED

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-2
SAMPLE: 85-15 NORTH BROKEN HILL LEAD WT %

ONE-WAY ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	D.F.	SUM OF SQUARES	MEAN SQUARE
BETWEEN LABS	8	.34922963E+00	.43653704E-01
WITHIN LABS	18	.19340000E+00	.10744444E-01
TOTAL	26	.54262963E+00	

REPEATABILITY VARIANCE	.10744444E-01
REPEATABILITY STD. DEV.	.10365541
BETWEEN-LABORATORIES VARIANCE	.10969753E-01
BETWEEN-LABORATORIES STD. DEV.	.10473659
REPEATABILITY	.29334482
PERMISSIBLE TOLERANCE BETWEEN LABS	.36177513
GRAND MEAN	70.88370370
VARIANCE OF THE GRAND MEAN	.16168038E-02

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-3
SAMPLE: 85-12 MINERALS,MIN & MET LEAD WT %

LABORATORY NO.	COUNTRY	BOTTLE NO.	ANALYTICAL RESULTS LEAD			LAB MEAN	LAB VARIANCE
1	LAB 1	1	37.0100	37.0500	36.9500	37.00333	.2533E-02
2	LAB 2	1	36.9800	36.9700	37.0100	36.98667	.4333E-03
3	LAB 3	1	36.6100	37.2400	35.9100	36.58667	.4426E+00
4	LAB 4	1	36.8000	36.8800	36.9600	36.88000	.6400E-02
5	LAB 5	1	37.0800	37.0900	36.9900	37.05333	.3033E-02
6	LAB 6	1	36.7900	37.3000	37.0000	37.03000	.6570E-01
7	LAB 7	1	36.8500	37.1600	37.0500	37.02000	.2470E-01
8	LAB 9	1	36.9200	36.8300	36.8700	36.87333	.2033E-02
9	LAB10	1	37.0300	36.9100	36.8900	36.94333	.5733E-02
10	LAB11	1	37.0200	37.0000	37.0000	37.00667	.1333E-03
11	LAB12	1	36.9600	36.9200	37.0000	36.96000	.1600E-02
12	LAB13	1	36.9500	36.9700	36.8000	36.90667	.8633E-02
13	LAB27	1	36.6900	36.6900	36.7900	36.72333	.3333E-02
14	LAB28	1	36.8500	36.8300	36.8000	36.82667	.6333E-03

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-3
SAMPLE: 85-12 MINERALS,MIN & MET LEAD WT %

BARTLETT'S TEST FOR HOMOGENEITY OF LABORATORY VARIANCE

CALCULATED STATISTIC	53.410
CHI-SQUARE(.95,13)	22.367

VARIANCE IS INHOMOGENEOUS

COCHRAN'S TEST FOR LABORATORY VARIANCE (ALPHA=.05)

LAB 3	C-CALC = .780	C-CRIT(3,14) = .352
LAB 6	C-CALC = .526	C-CRIT(3,13) = .371
LAB 7	C-CALC = .417	C-CRIT(3,12) = .392

DIXON'S TEST FOR LABORATORY MEANS (ALPHA=.05)

NONE REJECTED

LIST OF LABORATORIES WHOSE RESULTS WERE NOT USED FOR ONE-WAY ANOVA

LAB 3	COCHRAN'S TEST FOR LABORATORY VARIANCE
LAB 6	COCHRAN'S TEST FOR LABORATORY VARIANCE
LAB 7	COCHRAN'S TEST FOR LABORATORY VARIANCE

LIST OF INDIVIDUAL OUTLIERS DETECTED BY DIXON'S TEST WITHIN-LABORATORIES

NONE REJECTED

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-3
SAMPLE: 85-12 MINERALS,MIN & MET LEAD WT %

ONE-WAY ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	D.F.	SUM OF SQUARES	MEAN SQUARE
BETWEEN LABS	10	.26998788E+00	.26998788E-01
WITHIN LABS	22	.69000001E-01	.31363637E-02
TOTAL	32	.33898788E+00	

REPEATABILITY VARIANCE	.31363637E-02
REPEATABILITY STD. DEV.	.05600325
BETWEEN-LABORATORIES VARIANCE	.79541414E-02
BETWEEN-LABORATORIES STD. DEV.	.08918599
REPEATABILITY	.15848919
PERMISSIBLE TOLERANCE BETWEEN LABS	.27615817
GRAND MEAN	36.92393939
VARIANCE OF THE GRAND MEAN	.81814509E-03

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-3
SAMPLE: 85-13 CLEVELAND TIN-LEAD LEAD WT %

LABORATORY NO.	COUNTRY	BOTTLE NO.	ANALYTICAL RESULTS LEAD			LAB MEAN	LAB VARIANCE
1	LAB 1	1	10.7300	10.7900	10.8100	10.77667	.1733E-02
2	LAB 2	1	10.6900	10.5700	10.5500	10.60333	.5733E-02
3	LAB 3	1	8.3900	8.5300	8.8200	8.58000	.4810E-01
4	LAB 4	1	10.3700	10.4600	9.9000	10.24333	.9043E-01
5	LAB 5	1	10.4800	10.4600	10.4400	10.46000	.4000E-03
6	LAB 6	1	11.3200	11.2200	11.0900	11.21000	.1330E-01
7	LAB 7	1	10.9800	11.1300	11.0300	11.04667	.5833E-02
8	LAB 9	1	10.7700	10.8000	10.8600	10.81000	.2100E-02
9	LAB10	1	11.1300	11.0600	11.1300	11.10667	.1633E-02
10	LAB11	1	11.0300	11.2500	11.1300	11.13667	.1213E-01
11	LAB12	1	11.2100	11.0900	11.0500	11.11667	.6933E-02
12	LAB13	1	10.7900	10.8200	10.9500	10.85333	.7233E-02
13	LAB27	1	10.1600	10.2600	10.1600	10.19333	.3333E-02
14	LAB28	1	10.8100	10.7600	10.5000	10.69000	.2770E-01

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-3
SAMPLE: 85-13 CLEVELAND TIN-LEAD LEAD WT %

BARTLETT'S TEST FOR HOMOGENEITY OF LABORATORY VARIANCE

CALCULATED STATISTIC	21.551
CHI-SQUARE(.95,13)	22.367

VARIANCE IS HOMOGENEOUS
(COCHRAN'S TEST NOT PERFORMED)

DIXON'S TEST FOR LABORATORY MEANS (ALPHA=.05)

LAB 3 R = .656 D-CRIT(14) = .587

LIST OF LABORATORIES WHOSE RESULTS WERE NOT USED FOR ONE-WAY ANOVA

LAB 3 DIXON'S TEST FOR LABORATORY MEANS

LIST OF INDIVIDUAL OUTLIERS DETECTED BY DIXON'S TEST WITHIN-LABORATORIES

NONE REJECTED

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-3
SAMPLE: 85-13 CLEVELAND TIN-LEAD LEAD WT %

ONE-WAY ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	D.F.	SUM OF SQUARES	MEAN SQUARE
BETWEEN LABS	12	.41477744E+01	.34564786E+00
WITHIN LABS	26	.35700000E+00	.13730769E-01
TOTAL	38	.45047744E+01	

REPEATABILITY VARIANCE	.13730769E-01
REPEATABILITY STD. DEV.	.11717837
BETWEEN-LABORATORIES VARIANCE	.11063903E+00
BETWEEN-LABORATORIES STD. DEV.	.33262446
REPEATABILITY	.33161477
PERMISSIBLE TOLERANCE BETWEEN LABS	.97009335
GRAND MEAN	10.78820513
VARIANCE OF THE GRAND MEAN	.88627657E-02

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-3
SAMPLE: 85-14 ELURA CONC LEAD WT %

LABORATORY NO.	COUNTRY	BOTTLE NO.	ANALYTICAL RESULTS LEAD			LAB MEAN	LAB VARIANCE
1	LAB 1	1	50.3300	50.2800	50.3400	50.31667	.1033E-02
2	LAB 2	1	50.1800	50.2400	50.2300	50.21667	.1033E-02
3	LAB 3	1	50.9000	49.2800	47.8100	49.33000	.2389E+01
4	LAB 4	1	49.8600	49.9600	50.3200	50.04667	.5853E-01
5	LAB 5	1	49.7100	50.2800	50.0100	50.00000	.8130E-01
6	LAB 6	1	50.1000	50.5900	50.4200	50.37000	.6190E-01
7	LAB 7	1	50.3000	50.8000	50.6300	50.57667	.6463E-01
8	LAB 9	1	50.1100	50.1700	50.1800	50.15333	.1433E-02
9	LAB10	1	50.1400	50.0600	50.1800	50.12667	.3733E-02
10	LAB11	1	50.1800	50.2100	50.1800	50.19000	.3000E-03
11	LAB12	1	50.2000	50.2200	50.2300	50.21667	.2333E-03
12	LAB13	1	50.2800	50.2600	50.1400	50.22667	.5733E-02
13	LAB27	1	49.7500	49.7500	49.6500	49.71667	.3333E-02
14	LAB28	1	49.8000	49.8300	49.8000	49.81000	.3000E-03

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-3
SAMPLE: 85-14 ELURA CONC LEAD WT %

BARTLETT'S TEST FOR HOMOGENEITY OF LABORATORY VARIANCE

CALCULATED STATISTIC	81.714
CHI-SQUARE(.95,13)	22.367

VARIANCE IS INHOMOGENEOUS

COCHRAN'S TEST FOR LABORATORY VARIANCE (ALPHA=.05)

LAB 3 C-CALC = .894 C-CRIT(3,14) = .352

DIXON'S TEST FOR LABORATORY MEANS (ALPHA=.05)

NONE REJECTED

LIST OF LABORATORIES WHOSE RESULTS WERE NOT USED FOR ONE-WAY ANOVA

LAB 3 COCHRAN'S TEST FOR LABORATORY VARIANCE

LIST OF INDIVIDUAL OUTLIERS DETECTED BY DIXON'S TEST WITHIN-LABORATORIES

NONE REJECTED

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-3
SAMPLE: 85-14 ELURA CONC LEAD WT %

ONE-WAY ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	D.F.	SUM OF SQUARES	MEAN SQUARE
BETWEEN LABS	12	.18350359E+01	.15291966E+00
WITHIN LABS	26	.56700000E+00	.21807692E-01
TOTAL	38	.24020359E+01	

REPEATABILITY VARIANCE	.21807692E-01
REPEATABILITY STD. DEV.	.14767428
BETWEEN-LABORATORIES VARIANCE	.43703989E-01
BETWEEN-LABORATORIES STD. DEV.	.20905499
REPEATABILITY	.41791821
PERMISSIBLE TOLERANCE BETWEEN LABS	.66132344
GRAND MEAN	50.15128205
VARIANCE OF THE GRAND MEAN	.39210169E-02

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-3
SAMPLE: 85-15 NORTH BROKEN HILL LEAD WT %

LABORATORY NO.	COUNTRY	BOTTLE NO.	ANALYTICAL RESULTS LEAD			LAB MEAN	LAB VARIANCE
1	LAB 1	1	70.8200	70.9000	70.9000	70.87333	.2133E-02
2	LAB 2	1	70.9700	70.9200	70.8400	70.91000	.4300E-02
3	LAB 3	1	70.7300	67.2300	68.9100	68.95667	.3064E+01
4	LAB 4	1	71.0100	71.0600	71.3300	71.13333	.2963E-01
5	LAB 5	1	70.3700	69.8400	69.5400	69.91667	.1766E+00
6	LAB 6	1	70.7100	70.6900	71.3000	70.90000	.1201E+00
7	LAB 7	1	70.6600	71.0800	71.0800	70.94000	.5880E-01
8	LAB 9	1	70.7200	70.7800	70.7300	70.74333	.1033E-02
9	LAB10	1	70.9500	70.8800	70.9500	70.92667	.1633E-02
10	LAB11	1	71.0400	70.9900	70.9900	71.00667	.8333E-03
11	LAB12	1	70.8300	70.8600	70.9000	70.86333	.1233E-02
12	LAB13	1	70.6300	70.9900	70.2100	70.61000	.1524E+00
13	LAB27	1	70.9000	70.9000	70.9000	70.90000	.0000E+00
14	LAB28	1	70.9500	70.9200	70.9200	70.93000	.3000E-03

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-3
SAMPLE: 85-15 NORTH BROKEN HILL LEAD WT %

BARTLETT'S TEST FOR HOMOGENEITY OF LABORATORY VARIANCE

CALCULATED STATISTIC	69.714
CHI-SQUARE(.95,12)	21.030

VARIANCE IS INHOMOGENEOUS

COCHRAN'S TEST FOR LABORATORY VARIANCE (ALPHA=.05)

LAB 3 C-CALC = .848 C-CRIT(3,13) = .371

DIXON'S TEST FOR LABORATORY MEANS (ALPHA=.05)

LAB 3	R =	.834	D-CRIT(14) =	.587
LAB 5	R =	.808	D-CRIT(13) =	.610

LIST OF LABORATORIES WHOSE RESULTS WERE NOT USED FOR ONE-WAY ANOVA

LAB 3	DIXON'S TEST FOR MEANS AND COCHRAN'S TEST FOR VARIANCE
LAB 5	DIXON'S TEST FOR LABORATORY MEANS

LIST OF INDIVIDUAL OUTLIERS DETECTED BY DIXON'S TEST WITHIN-LABORATORIES

NONE REJECTED

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-3
SAMPLE: 85-15 NORTH BROKEN HILL LEAD WT %

ONE-WAY ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	D.F.	SUM OF SQUARES	MEAN SQUARE
BETWEEN LABS	11	.53849722E+00	.48954293E-01
WITHIN LABS	24	.74480000E+00	.31033333E-01
TOTAL	35	.12832972E+01	

REPEATABILITY VARIANCE	.31033333E-01
REPEATABILITY STD. DEV.	.17616280
BETWEEN-LABORATORIES VARIANCE	.59736532E-02
BETWEEN-LABORATORIES STD. DEV.	.07728941
REPEATABILITY	.49854073
PERMISSIBLE TOLERANCE BETWEEN LABS	.41486603
GRAND MEAN	70.89472222
VARIANCE OF THE GRAND MEAN	.13598415E-02

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-4
SAMPLE: 85-12 MINERALS,MIN & MET LEAD WT %

LABORATORY NO.	COUNTRY	BOTTLE NO.	ANALYTICAL RESULTS LEAD			LAB MEAN	LAB VARIANCE
1	LAB 9	1	36.9400	37.0700	36.7700	36.92667	.2263E-01
2	LAB10	1	36.3100	36.8800	36.1900	36.46000	.1359E+00
3	LAB11	1	36.0000	36.2400	36.0700	36.10333	.1523E-01
4	LAB12	1	36.9200	36.9200	37.0800	36.97333	.8533E-02
5	LAB17	1	36.6200	36.5300	36.6200	36.59000	.2700E-02
6	LAB18	1	36.8700	36.9100	37.0400	36.94000	.7900E-02

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-4
SAMPLE: 85-12 MINERALS,MIN & MET LEAD WT %

BARTLETT'S TEST FOR HOMOGENEITY OF LABORATORY VARIANCE

CALCULATED STATISTIC	8.144
CHI-SQUARE(.95, 5)	11.073

VARIANCE IS HOMOGENEOUS
(COCHRAN'S TEST NOT PERFORMED)

DIXON'S TEST FOR LABORATORY MEANS (ALPHA=.05)

NONE REJECTED

LIST OF LABORATORIES WHOSE RESULTS WERE NOT USED FOR ONE-WAY ANOVA

ALL RESULTS WERE USED EXCEPT INDIVIDUAL REPLICATES LISTED BELOW

LIST OF INDIVIDUAL OUTLIERS DETECTED BY DIXON'S TEST WITHIN-LABORATORIES

NONE REJECTED

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-4
SAMPLE: 85-12 MINERALS,MIN & MET LEAD WT %

ONE-WAY ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	D.F.	SUM OF SQUARES	MEAN SQUARE
BETWEEN LABS	5	.18068444E+01	.36136889E+00
WITHIN LABS	12	.38580000E+00	.32150000E-01
TOTAL	17	.21926444E+01	

REPEATABILITY VARIANCE	.32150000E-01
REPEATABILITY STD. DEV.	.17930421
BETWEEN-LABORATORIES VARIANCE	.10973963E+00
BETWEEN-LABORATORIES STD. DEV.	.33126972
REPEATABILITY	.50743092
PERMISSIBLE TOLERANCE BETWEEN LABS	1.00381113
GRAND MEAN	36.66555556
VARIANCE OF THE GRAND MEAN	.20076049E-01

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-4
SAMPLE: 85-13 CLEVELAND TIN-LEAD LEAD WT %

LABORATORY NO.	COUNTRY	BOTTLE NO.	ANALYTICAL RESULTS LEAD			LAB MEAN	LAB VARIANCE
1	LAB 9	1	10.7100	10.7500	10.7300	10.73000	.4000E-03
2	LAB10	1	10.6100	10.7000	10.5200	10.61000	.8100E-02
3	LAB11	1	10.0600	10.4300	10.6400	10.37667	.8623E-01
4	LAB12	1	10.8900	10.9000	10.8000	10.86333	.3033E-02
5	LAB17	1	10.5500	10.2500	10.0000	10.26667	.7583E-01
6	LAB18	1	10.8800	10.9600	11.1500	10.99667	.1923E-01

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-4
SAMPLE: 85-13 CLEVELAND TIN-LEAD LEAD WT %

BARTLETT'S TEST FOR HOMOGENEITY OF LABORATORY VARIANCE

CALCULATED STATISTIC	11.374
CHI-SQUARE(.95, 5)	11.073

VARIANCE IS INHOMOGENEOUS

COCHRAN'S TEST FOR LABORATORY VARIANCE (ALPHA=.05)

NONE REJECTED

DIXON'S TEST FOR LABORATORY MEANS (ALPHA=.05)

NONE REJECTED

LIST OF LABORATORIES WHOSE RESULTS WERE NOT USED FOR ONE-WAY ANOVA

ALL RESULTS WERE USED EXCEPT INDIVIDUAL REPLICATES LISTED BELOW

LIST OF INDIVIDUAL OUTLIERS DETECTED BY DIXON'S TEST WITHIN-LABORATORIES

NONE REJECTED

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-4
SAMPLE: 85-13 CLEVELAND TIN-LEAD LEAD WT %

ONE-WAY ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	D.F.	SUM OF SQUARES	MEAN SQUARE
BETWEEN LABS	5	.11844278E+01	.23688556E+00
WITHIN LABS	12	.38566667E+00	.32138889E-01
TOTAL	17	.15700944E+01	

REPEATABILITY VARIANCE	.32138889E-01
REPEATABILITY STD. DEV.	.17927322
BETWEEN-LABORATORIES VARIANCE	.68248889E-01
BETWEEN-LABORATORIES STD. DEV.	.26124488
REPEATABILITY	.50734322
PERMISSIBLE TOLERANCE BETWEEN LABS	.82176463
GRAND MEAN	10.64055556
VARIANCE OF THE GRAND MEAN	.13160309E-01

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-4
SAMPLE: 85-14 ELURA CONC LEAD WT %

LABORATORY NO.	COUNTRY	BOTTLE NO.	ANALYTICAL RESULTS LEAD			LAB MEAN	LAB VARIANCE
1	LAB 9	1	50.2000	50.0800	50.1000	50.12667	.4133E-02
2	LAB10	1	50.0300	50.2300	50.2100	50.15667	.1213E-01
3	LAB11	1	49.0300	49.6100	49.6900	49.44333	.1297E+00
4	LAB12	1	49.9700	49.9500	50.0000	49.97333	.6333E-03
5	LAB17	1	49.9400	49.9300	49.8300	49.90000	.3700E-02
6	LAB18	1	50.1400	50.1600	50.1600	50.15333	.1333E-03

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-4
SAMPLE: 85-14 ELURA CONC LEAD WT %

BARTLETT'S TEST FOR HOMOGENEITY OF LABORATORY VARIANCE

CALCULATED STATISTIC	19.615
CHI-SQUARE(.95, 5)	11.073

VARIANCE IS INHOMOGENEOUS

COCHRAN'S TEST FOR LABORATORY VARIANCE (ALPHA=.05)

LAB11 C-CALC = .862 C-CRIT(3, 6) = .616

DIXON'S TEST FOR LABORATORY MEANS (ALPHA=.05)

LAB11 R = .640 D-CRIT(6) = .627

LIST OF LABORATORIES WHOSE RESULTS WERE NOT USED FOR ONE-WAY ANOVA

LAB11 DIXON'S TEST FOR MEANS AND COCHRAN'S TEST FOR VARIANCE

LIST OF INDIVIDUAL OUTLIERS DETECTED BY DIXON'S TEST WITHIN-LABORATORIES

NONE REJECTED

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-4
SAMPLE: 85-14 ELURA CONC LEAD WT %

ONE-WAY ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	D.F.	SUM OF SQUARES	MEAN SQUARE
BETWEEN LABS	4	.16677333E+00	.41693333E-01
WITHIN LABS	10	.41466667E-01	.41466667E-02
TOTAL	14	.20824000E+00	

REPEATABILITY VARIANCE	.41466667E-02
REPEATABILITY STD. DEV.	.06439462
BETWEEN-LABORATORIES VARIANCE	.12515556E-01
BETWEEN-LABORATORIES STD. DEV.	.11187294
REPEATABILITY	.18223677
PERMISSIBLE TOLERANCE BETWEEN LABS	.34182006
GRAND MEAN	50.06200000
VARIANCE OF THE GRAND MEAN	.27795556E-02

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-4
SAMPLE: 85-15 NORTH BROKEN HILL LEAD WT %

LABORATORY NO.	COUNTRY	BOTTLE NO.	ANALYTICAL RESULTS LEAD			LAB MEAN	LAB VARIANCE
1	LAB 9	1	70.7500	70.6400	71.1300	70.84000	.6610E-01
2	LAB10	1	70.0600	70.8000	70.8600	70.57333	.1985E+00
3	LAB11	1	69.6400	70.3000	70.8000	70.24667	.3385E+00
4	LAB12	1	70.6700	70.8800	70.8500	70.80000	.1290E-01
5	LAB17	1	70.4600	70.2700	70.4700	70.40000	.1270E-01
6	LAB18	1	70.8600	70.8800	70.9100	70.88333	.6333E-03

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-4
SAMPLE: 85-15 NORTH BROKEN HILL LEAD WT %

BARTLETT'S TEST FOR HOMOGENEITY OF LABORATORY VARIANCE

CALCULATED STATISTIC	13.344
CHI-SQUARE(.95, 5)	11.073

VARIANCE IS INHOMOGENEOUS

COCHRAN'S TEST FOR LABORATORY VARIANCE (ALPHA=.05)

NONE REJECTED

DIXON'S TEST FOR LABORATORY MEANS (ALPHA=.05)

NONE REJECTED

LIST OF LABORATORIES WHOSE RESULTS WERE NOT USED FOR ONE-WAY ANOVA

ALL RESULTS WERE USED EXCEPT INDIVIDUAL REPLICATES LISTED BELOW

LIST OF INDIVIDUAL OUTLIERS DETECTED BY DIXON'S TEST WITHIN-LABORATORIES

NONE REJECTED

ISO/TC 183/WG 5A --- LEAD IN LEAD CONCENTRATES --- METHOD WG 5A-4
SAMPLE: 85-15 NORTH BROKEN HILL LEAD WT %

ONE-WAY ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	D.F.	SUM OF SQUARES	MEAN SQUARE
BETWEEN LABS	5	.10200278E+01	.20400556E+00
WITHIN LABS	12	.12588000E+01	.10490000E+00
TOTAL	17	.22788278E+01	

REPEATABILITY VARIANCE	.10490000E+00
REPEATABILITY STD. DEV.	.32388269
BETWEEN-LABORATORIES VARIANCE	.33035185E-01
BETWEEN-LABORATORIES STD. DEV.	.18175584
REPEATABILITY	.91658803
PERMISSIBLE TOLERANCE BETWEEN LABS	.82743115
GRAND MEAN	70.62388889
VARIANCE OF THE GRAND MEAN	.11333642E-01